-TENDER SPECIFICATIONS

E- TENDER SPECIFICATION NUMBER: BHE/PW/PUR/LRPT2-CPS/2883

FOR

SUPPLY, ERECTION & COMMISSIONING OF CONSTRUCTION POWER SUPPLY SYSTEM AT 2x800MW NTPC LARA PROJECT

VOLUME I – TECHNICAL BID

THIS TENDER SPECIFICATION CONSISTS OF:

Notice Inviting Tender	
Volume-IA	Technical Conditions of Contracc
Volume-IB	Special conditions of Contract
Volume-IC	General conditions of Contract
Volume-ID	Forms & Procedures
Volume-IE	Technical Specification and Drawing
Volume II	Price Bid

Bharat Heavy Electricals Limited
(*A Government of India Undertaking*)
Power Sector – Western Region
345-Kingsway, Nagpur-440001

CONTENTS		
Volume No	Description	Hosted in website bhel.com (Briefly) and detailed in BHEL e-Procurement Portal as files titled
NIL	Tender Specification Issue Details	(Part of Vol-IA-2883)
NIL	Notice Inviting Tender	(Part of Vol-IA-2883)
I-A	Technical Conditions of Contract	Vol-I-A-2883
I-B	Special Conditions of Contract	Vol-I-BCD-2883
I-C	General Conditions of Contract	(Part of Vol-I-BCD-2883)
I-D	Forms & Procedures	(Part of Vol-I-BCD-2883)
I-E	Technical Specification & Drawing	Vol-IE-2883
II	Price Bid Specification as specified in E-Procurement Portal	Volume-II-2883

E-T E N D E R S P E C I F I C A T I O N S

E- TENDER SPECIFICATION NUMBER: BHE/PW/PUR/LRPT2-CPS/2883

FOR

SUPPLY, ERECTION & COMMISSIONING OF CONSTRUCTION POWER SUPPLY SYSTEM AT 2x800MW NTPC LARA PROJECT

EARNEST MONEY DEPOSIT: Refer Notice Inviting Tender

LAST DATE FOR TENDER SUBMISSION Refer Notice Inviting Tender

THESE TENDER SPECIFICATION DOCUMENTS CONTAINING VOLUME-I AND VOLUME- II ARE ISSUED TO:

M/s. ……
…….

PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

GM (Purchase)
Place: Nagpur
Dae:

Date: 08/11/2023

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NOTICE INVITING TENDER (NIT)

NOTE: BIDDER MAY DOWNLOAD FROM WEB SITES

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To,

Dear Sir/Madam,

Sub : NOTICE INVITING E-TENDER

Sealed offers in two part bid system (National competitive bidding (NCB) ~~or International Co07/11mpetitive Bidding (ICB~~ are invited from reputed & experienced bidders (meeting PRE QUALIFICATION CRITERIA as mentioned in Annexure-1) through E-Procurement Portal https://eprocurebhel.co.in only, for the subject job by the undersigned on the behalf of BHARAT HEAVY ELECTRICALS LIMITED as per the tender document. Following points relevant to the tender may please be noted and complied with.

1.0 Salient Features of NIT

S No.	ISSUE	DESCRIPTION	
i	TENDER NUMBER	BHE/PW/PUR/LRPT2-CPS/2883	
ii	Broad Scope of job	SUPPLY, ERECTION & COMMISSIONING OF CONSTRUCTION POWER SUPPLY SYSTEM AT 2x800MW NTPC LARA PROJECT	
iii	DETAILS OF TENDER DOCUMENT		
A	Volume-IA	*Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc.*	*Applicable*
B	Volume-IB	*Special Conditions of Contract (SCC)*	*Applicable*
C	Volume-IC	*General Conditions of Contract (GCC)*	*Applicable*
D	Volume-ID	*Forms and Procedures*	*Applicable*
~~E~~	Volume-IE	*Drawing and Plot Plan*	*Applicable*
	Volume-II	*Price Schedule (Absolute value).*	*Applicable*
iv	Issue of Tender Documents	Tender documents will be available for downloading from BHEL website (www.bhel.com) or e-procurement portal (https://eprocurebhel.co.in) as per schedule below: *Start: 08/11/2023, Time :18:00 Hrs* *Closes: 18/11/2023, Time: 13:00 Hrs* Brief information of the tenders shall also be available at central public procurement portal. (*https://eprocure.gov.in/epublish/app*)	*Applicable*
v	DUE DATE & TIME OF	*Date: 18/11/2023, Time :13:00 Hrs*	*Applicable*

S No.	ISSUE	DESCRIPTION	
	OFFER SUBMISSION	The bidder should submit their offer online only in e-Procurement portal at https://eprocurebhel.co.in ***Bidders are requested to upload their offer well in advance in order to avoid last minute congestion at this website.*** Hard copy bid or bids through E-mail / fax shall not be accepted.	
vi	OPENING OF TENDER (Techno-Commercial Bid)	*Date:18/11/2023, Time: 17:00 Hrs* *Notes:* *(1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day.* *(2) Bidder may depute representative to witness the opening of tender. For e-Tender, Bidder may witness the opening of tender through e-Procurement portal only.*	*Applicable*
vii	EMD AMOUNT	*Rs 2,00,000/- (Rupees Two Lakh Only)* *Important Note: Bidders kindly to take note that EMD (Earnest Money Deposit) shall be furnished by MSE bidders as well, as per the amount and procedure indicated in the NIT/GCC..*	*Applicable*
viii	COST OF TENDER	*NIL*	*Not Applicable*
ix	LAST DATE FOR SEEKING CLARIFICATION	One day before due date of offer submission. Along with soft version also, addressing to undersigned & to others as per contact address given below: 1) Name: Viveka Nand Jha/ Tapish Kumar Designation: Manager Deptt: Purchase Address: Floor no. 5 & 6,Shree Mohini Complex, 345 Kingsway, Nagpur-440001 Mobile-9429198214/ 9010903666 Email:vivekjha@bhel.in/tapishkhandelwal@bhel.in 2) Mr. Kamlesh Kumar Designation: DGM Deptt: Purchase Address: Floor no. 5 & 6,Shree Mohini Complex, 345 Kingsway, Nagpur-440001 Email: kamleshbhel@bhel.in Mob: 9425554615 3) Name: R. M. Malhotra Designation: GM Deptt: Purchase Address: Floor no. 5 & 6, Shree Mohini Complex, 345	*Applicable*

S No.	ISSUE	DESCRIPTION	
		Kingsway, Nagpur-440001 Email :rmalhotra@bhel.in	
x	SCHEDULE OF Pre Bid Discussion (PBD)	---	*Not Applicable*
xi	INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)	1) *Shri Otem Dai, IAS (Retd.)* 2) *Shri Bishwamitra Pandey, IRAS (Retd.)* 3) *Shri Mukesh Mittal, IRS (Retd.)*	*Applicable*
xii	Latest updates	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com-->Tender Notifications →View Corrigendum), Central Public Procurement portal (https://eprocure.gov.in/epublish/app) & on e-tender portal https://eprocurebhel.co.in **and not in the newspapers**. Bidders to keep themselves updated with all such information.	

2.0 The offer shall be submitted as per the instructions of tender document and as detailed in this NIT. Bidders to note specifically that all pages of tender document, including these NIT pages of this particular tender together with subsequent correspondences shall be submitted by them, duly signed digitally using Class III DSC & uploaded in E-Procurement Portal, as part of offer. **Rates/Price including discounts/rebates, if any, mentioned anywhere/in any form in the techno-commercial offer other than the Price Bid, shall not be entertained.**

3.0 Not Used

4.0 Unless specifically stated otherwise, bidder shall deposit EMD as per clause 1.9 of General Conditions of Contract.

For Electronic Fund Transfer the details are as below-:

NAME OF THE BENEFICIARY	BHARAT HEAVY ELECTRICALS LTD
ADDRESS OF THE COMPANY	5th Floor, SHREE MOHINI COMPLEX 345, KINGSWAY,NAGPUR
NAME OF BANK	STATE BANK OF INDIA
NAME OF BANK BRANCH AND BRANCH CODE	SBI,NAGPUR MAIN BRANCH ,CODE-00432
CITY	NAGPUR
ACCOUNT NUMBER	40227423158
ACCOUNT TYPE	MC-C C Clean (C&I)
IFSC CODE OF THE BENEFICIARY BANK BRANCH	SBIN0000432
MICR CODE OF THE BANK BRANCH	440002002

(Note -: In case of E-Tenders, proof of remittance of EMD should be uploaded in the E-Procurement Portal and originals, as applicable, shall be sent to the officer inviting tender within a reasonable time, failing which the offer is liable to be rejected.

(Note -: In case of E-Tenders, proof of remittance of EMD should be uploaded in the E-Procurement Portal and originals, as applicable, shall be sent to the officer inviting tender within a reasonable time, failing which the offer is liable to be rejected.

5.0 Procedure for Submission of Tenders:

This is an E-tender floated online through our E-Procurement Site (https://eprocurebhel.co.in). The bidder should respond by submitting their offer online only in our e-Procurement platform at (https://eprocurebhel.co.in). Offers are invited in two-parts only.

Documents Comprising the e-Tender

The tender shall be submitted online ONLY EXCEPT EMD (in physical form) as mentioned below:

a. Technical Tender (UN priced Tender)

All Technical details (e.g. Eligibility Criteria requested (as mentioned below)) should be attached in e-tendering module, failing which the tender stands invalid & may be REJECTED. Bidders shall furnish the following information along with technical tender (preferably in pdf format):

i. ~~Earnest Money Deposit (EMD) furnished in accordance with NIT Clause 4.0. Alternatively, documentary evidence for claiming exemption as per clause 29 of NIT.~~
ii. Technical Bid (without indicating any prices).

b. Price Bid:

i. Prices are to be quoted in the attached Price Bid format online on e-tender portal.
ii. The price should be quoted for the accounting unit indicated in the e-tender document.

Note:

- It is the responsibility of tenderer to go through the Tender document to ensure furnishing all required documents in addition to above, if any. Any deviation would result in REJECTION of tender and would not be considered at a later stage at any cost by BHEL.
- A person signing (manually or digitally) the tender form or any documents forming part of the contract on behalf of another shall be deemed to warrantee that he has authority to bind such other persons and if, on enquiry, it appears that the persons so signing had no authority to do so, the purchaser may, without prejudice to other civil and criminal remedies, cancel the contract and hold the signatory liable for all cost and damages.
- A tender, which does not fulfil any of the above requirements and/or gives evasive information/reply against any such requirement, shall be liable to be ignored and rejected.

DO NOT'S

Bidders are requested NOT to submit the hard copy of the Bid. In case offer is sent through hard copy/fax/telex/cable/electronically in place of e-tender, the same shall not be considered. Also, uploading of the price bid in prequalification bid or technical bid may RESULT IN REJECTION of the tender.

Digital Signing of e-Tender

Tenders shall be uploaded with all relevant PDF/zip format. The relevant tender documents should be uploaded by an authorized person having Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION digital signature certificate (DSC).

The Requirement:

1. A PC with Internet connectivity &
2. DSC (Digital Signature Certificate) (Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION)

BHEL has finalized the e-procurement service Provider-:
NIC PORTAL (https://eprocurebhel.co.in)

For E-PROCUREMENT ASSISTANCE & TRAINING, NIC PORTAL HELPDESK CONTACTS AS PER FOLLOWING:

For any technical related queries, please call at 24 x 7 Help Desk Number
0120-4001 002
0120-4200 462
0120-4001 005
0120-6277 787
1. Peter Raj, NIC, Ph: 9942069052
Email Support: support-eproc@nic.in
Other details/update yourself from : https://eprocurebhel.co.in

The process of utilizing e-procurement necessitates usage of DSC (Digital Signature Certificate) (Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION) and you are requested to procure the same immediately, if not presently available with you. Please note that only with DSC, you will be able to login the e-procurement secured site and take part in the tendering process.

The contact details of the DSC certifying authority:-
please refer http://www.mca.gov.in/ →MCA SERVICES → DSC SERVICES

Vendors are requested to go through seller manual available on https://eprocurebhel.co.in.

~~Procedure for Submission of Tenders (To be used in case of Paper bid only): The Tenderers must submit their Tenders to Officer inviting Tender, as detailed below:~~

- ~~PART-I consisting of 'PART-I A (Techno Commercial Bid)' & 'PART-I B (EMD)' in two separate sealed and superscribed envelopes (ENVELOPE-I & ENVELOPE-II)~~
- ~~PART-II (Price Bid) – in sealed and superscribed envelope (ENVELOPE-III)~~

~~One set of tender documents shall be retained by the bidder for their reference~~

6.0 ~~The contents for ENVELOPES and the superscription for each sealed cover/Envelope are as given below. (All pages to be signed and stamped) (To be used in case of Paper bid only):~~

~~Sl. no.~~	~~Description~~	~~Remarks~~
	~~Part-I A~~	
	~~ENVELOPE – I superscribed as:~~ ~~PART-I (TECHNO COMMERCIAL BID)~~	

	TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION: CONTAINING THE FOLLOWING:	
i.	Covering letter/Offer forwarding letter of Tenderer.	
ii.	Duly filled in `No Deviation Certificate' as per prescribed format to be placed after document under sl no (i) above. Note: a. In case of any deviation, the same should be submitted separately for technical & commercial parts, indicating respective clauses of tender against which deviation is taken by bidder. The list of such deviation shall be placed after document under sl no (i) above. It shall be specifically noted that deviation recorded elsewhere shall not be entertained. b. BHEL reserves the right to accept/reject the deviations without assigning any reasons, and BHEL decision is final and binding. i). In case of acceptance of the deviations, appropriate loading shall be done by BHEL ii). In case of unacceptable deviations, BHEL reserves the right to reject the tender	
iii.	Supporting documents/ annexure/ schedules/ drawing etc. as required in line with Pre-Qualification criteria. It shall be specifically noted that all documents as per above shall be indexed properly and credential certificates issued by clients shall distinctly bear the name of organization, contact ph. no, FAX no, etc.	
iv.	All Amendments/Correspondences/Corrigenda/Clarifications/Changes/ Errata etc. pertinent to this NIT.	
v.	Integrity Pact Agreement (Duly signed by the authorized signatory)	If applicable
vi.	Duly filled in annexures, formats etc. as required under this Tender Specification/NIT	
vii.	Notice inviting Tender (NIT)	
viii.	Volume – I A : Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc.	
ix.	Volume – I B : Special Conditions of Contract (SCC)	
x.	Volume – I C : General Conditions of Contract (GCC)	
xi.	Volume – I D : Forms & Procedures	
xii.	Volume – II (UNPRICED – without disclosing rates/price, but mentioning only 'QUOTED' or 'UNQUOTED' against each item	
xiii.	Any other details preferred by bidder with proper indexing.	

	PART-I B	
	ENVELOPE – II superscribed as:	

	~~PART-I (EMD)~~ ~~TENDER NO :~~ ~~NAME OF WORK :~~ ~~PROJECT:~~ ~~DUE DATE OF SUBMISSION:~~ ~~CONTAINING THE FOLLOWING:~~	
	~~Earnest Money Deposit (EMD) in the form as indicated in this Tender~~	

	~~PART-II~~	
	~~PRICE BID~~ ~~consisting of the following shall be enclosed~~	
	~~ENVELOPE-III~~ ~~superscribed as:~~ ~~PART-II (PRICE BID)~~ ~~TENDER NO :~~ ~~NAME OF WORK :~~ ~~PROJECT:~~ ~~DUE DATE OF SUBMISSION:~~ ~~CONTAINING THE FOLLOWING~~	
~~i~~	~~Covering letter/Offer forwarding letter of Tenderer enclosed in Part I~~	
~~ii~~	~~Volume II – PRICE BID (Duly Filled in Schedule of Rates – rate/price to be entered in words as well as figures)~~	

	~~OUTER COVER~~	
	~~ENVELOPE-IV~~ ~~(MAIN ENVELOPE / OUTER ENVELOPE)~~ ~~superscribed as:~~ ~~TECHNO-COMMERCIAL BID, PRICE BID & EMD~~ ~~TENDER NO:~~ ~~NAME OF WORK:~~ ~~PROJECT:~~ ~~DUE DATE OF SUBMISSION:~~ ~~CONTAINING THE FOLLOWING:~~	
~~i~~	~~o Envelopes I~~ ~~o Envelopes II~~ ~~o Envelopes III~~	

- SPECIAL NOTE: All documents/ annexures to be submitted should be uploaded in respective places in the E-Tender portal as per the list mentioned given in this NIT. BHEL shall not be responsible for any in-complete documents.

7.0 Deviation with respect to tender clauses and additional clauses/suggestions in Techno-commercial bid / Price bid shall NOT be considered by BHEL. Bidders are requested to positively comply with the same.

8.0 BHEL reserves the right to accept or reject any or all Offers without assigning any reasons thereof. BHEL also reserves the right to cancel the Tender wholly or partly without assigning any reason thereof. Also BHEL shall not entertain any correspondence from bidders in this matter (except for the refund of EMD).

9.0 Assessment of Capacity of Bidders:

Bidder's capacity for executing the job under tender shall be assessed based on its 'LOAD and PERFORMANCE' and 'AVERAGE ANNUAL TURNOVER', as per the following:

I. LOAD: Load takes into consideration ALL the contracts of the Bidder under execution with BHEL Regions, irrespective of whether they are similar to the tendered scope or not. The cut off month for reckoning 'Load' shall be the 3rd Month preceding the month corresponding to the 'latest date of bid submission', in the following manner -

(Note: For example, if latest bid submission is in Jan 2017, then the 'load' shall be calculated up to and inclusive of Oct 2016)

Total number of Packages in hand = Load (P)

Where 'P' is the sum of all unit wise identified packages (refer table-1) under execution with BHEL Regions as on the cut off month defined above, including packages yet to be commenced, excepting packages which are on Long Hold.

II. PERFORMANCE: Here 'Monthly Performance' of the bidder for all the packages (under execution/ executed during the 'Period of Assessment' in all Power Sector Regions of BHEL) SIMILAR to the packages covered under the tendered scope, excepting packages not commenced shall be taken into consideration. The 'Period of Assessment' shall be 6 months preceding and including the cut off month. The cut off month for reckoning 'Period of Assessment' shall be the 3rd Month preceding the month corresponding to 'latest date of bid submission', in the following manner:

(Note: For example, if 'latest date of bid submission' is in Jan 2017, then the 'performance' shall be assessed for a 6 months' period up to and inclusive of Oct 2016 (i.e. from May 2016 to Oct 2016), for all the unit wise identified packages (refer Table I))

i). Calculation of Overall 'Performance Rating' for 'Similar Package/Packages' for the tendered scope under execution at Power Sector Regions for the 'Period of Assessment':

This shall be obtained by summing up the 'Monthly Performance Evaluation' scores obtained by the bidder in all Regions for all the similar Package/packages', divided by the total number of Package months for which evaluation should have been done, as per procedure below:

a) P_1, P_2, P_3, P_4, P_5 , …. P_N etc. be the packages (under execution/ executed during the 'Period of Assessment' in all Regions of BHEL) SIMILAR to the packages covered under the tendered

scope, excepting packages not commenced. Total number of similar packages for all Regions = **P_T** (i.e. $P_T = P_1 + P_2 + P_3 + P_4 + \ldots P_N$)

b) Number of Months 'T_1' for which 'Monthly Performance Evaluation' as per relevant formats, should have been done in the 'Period of Assessment' for the corresponding similar package P_1. Similarly T_2 for package P_2, T_3 for package P_3, etc. for the tendered scope. Now calculate cumulative total months '**T_T**' for total similar Packages '**P_T**' for all Regions (i.e. **T_T** = $T_1 + T_2 + T_3 + T_4 + \ldots T_N$)

c) Sum '**S_1** 'of 'Monthly Performance Evaluation' Scores ($S_{1\text{-}1}$, $S_{1\text{-}2}$, $S_{1\text{-}3}$, $S_{1\text{-}4}$, $S_{1\text{-}5}$.... $S_{1\text{-}T1}$) for similar package P_1, for the 'period of assessment' 'T_1' (i.e. $S_1 = S_{1\text{-}1} + S_{1\text{-}2} + S_{1\text{-}3} + S_{1\text{-}4} + S_{1\text{-}5} + \ldots S_{1\text{-}T1}$). Similarly, S_2 for package P_2 for period T_2, S_3 for package P_3 for period T_3 etc. for the tendered scope for all Regions. Now calculate cumulative sum 'S_T' of 'Monthly Performance Evaluation' Scores for total similar Packages '**P_T**' for all Regions (i.e. 'S_T'= $S_1 + S_2 + S_3 + S_4 + S_5 + \ldots S_N$.)

d) **Overall Performance Rating 'R_{BHEL}' for the Similar Package/Packages** (under execution/ executed during the 'Period of Assessment') in all the Power Sector Regions of BHEL

$$= \frac{\text{Aggregate of Performance scores for all similar packages in all the Regions}}{\text{Aggregate of months for each of the similar packages for which performance should have been evaluated in all the Regions}}$$

$$= \frac{S_T}{T_T}$$

e) Bidders to note that the risk of non-evaluation or non-availability of the 'Monthly Performance Evaluation' reports as per relevant formats is to be borne by the Bidder.

f) Table showing methodology for calculating 'a', 'b' and 'c' above

Sl. No.	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
1	Similar Packages for all Regions → (under execution/ executed during period of assessment)	P_1	P_2	P_3	P_4	P_5	…	P_N	Total No. of similar packages for all Regions = P_T i.e. Sum (Σ) of columns (iii) to (ix)

Sl. No.	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
2	Number of Months for which 'Monthly Performance Evaluation' as per relevant formats should have been done in the 'period of assessment' for corresponding Similar Packages (as in row 1)	T_1	T_2	T_3	T_4	T_5	…	T_N	Sum (Σ) of columns (iii) to (ix) = T_T
3	Monthly performance scores for the corresponding period (as in Row 2)	S_{1-1}, S_{1-2}, S_{1-3}, S_{1-4}, … S_{1-T1}	S_{2-1}, S_{2-2}, S_{2-3}, S_{2-4}, … S_{2-T2}	S_{3-1}, S_{3-2}, S_{3-3}, S_{3-4}, … S_{3-T3}	S_{4-1}, S_{4-2}, S_{4-3}, S_{4-4}, … S_{4-T4}	S_{5-1}, S_{5-2}, S_{5-3}, S_{5-4}, … S_{5-T5}	.. … … … …	S_{N-1}, S_{N-2}, S_{N-3}, S_{N-4}, … S_{N-TN}	--------
4	Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3)	S_1	S_2	S_3	S_4	S_5	…	S_N	Sum (Σ) of columns (iii) to (ix) = S_T

ii). Calculation of Overall 'Performance Rating' (R_{BHEL}) in case at least 6 evaluation scores for 'similar Package/Packages' for the tendered scope ARE NOT AVAILABLE, during the 'Period of Assessment':

This shall be obtained by summing up the 'Monthly Performance Evaluation' scores obtained by the bidder in all Regions for ALL the packages, divided by the total number of Package months for which evaluation should have been done. 'R_{BHEL}' shall be calculated subject to availability of 'performance scores' for at least 6 'package months' in the order of precedence below:

a) 'Period of Assessment' i.e. 6 months preceding and including the cut-off month

b) 12 months preceding and including the cut-off month

c) 24 months preceding and including the cut-off month

In case, R_{BHEL} cannot be calculated as above, then Bidder shall be treated as 'NEW VENDOR'. Further eligibility and qualification of this bidder shall be as per definition of 'NEW VENDOR' described in 'Explanatory Notes'.

iii). Factor "L" assigned based on Overall Performance Rating (R_{BHEL}) at Power Sector Regions:

Sl. no.	Overall Performance Rating (R_{BHEL})	Corresponding Value of 'L'
1	=60	NA
2	> 60 and ≤ 65	0.5
3	> 65 and ≤ 70	0.45
4	> 70 and ≤ 75	0.4
5	> 75 and ≤ 80	0.375
6	> 80 and < 90	0.35
7	≥90	0.33

iv). Performance Systems: The performance rating as mentioned in II (i) and (ii) above, shall be calculated as per Online Systems i.e. Contractor Performance Evaluation System (CPES) and Safety Performance Evaluation System (HSEPES). The scores assigned in HSEPES shall be scaled down to 10 and assigned in CPES against the category "HSE" (mentioned in Form F-15).

III. i) 'Assessment of Capacity based on 'LOAD and PERFORMANCE':

a) 'Assessment of Capacity of Bidder' is based on the Maximum number of packages for which a vendor is eligible, considering the performance scores of similar packages, as below:
Max number of packages P_{Max}= (R_{BHEL} - 60) divided by corresponding value of 'L', i.e. (R_{BHEL}- 60)/L

Note:

i). In case the value of P_{Max} results in a fraction, the value of P_{Max} is to be rounded off to next whole number

ii). For R_{BHEL} = 60, P_{Max} = '1'

The Bidder shall be considered 'Qualified' on 'Performance basis' as per 'Assessment of Capacity of Bidder' for the subject Tender if $P \leq P_{Max}$
(Where P is calculated as per clause 'I' above)

b) In addition to above, in case contractor fails to score 5 or more than 5 (five) marks in the scaled down scores of HSEPES for "3 or more than 3 months in a period of 6 months preceding and including the cut-off month in any single package", the contractor shall be considered disqualified for ongoing tender(s) of BHEL. Qualification of bidder for further tendering process shall be subject to qualifying this condition in addition to qualifying requirements mentioned in PQR. Bidders who did not qualify this condition shall not be considered under the provisions of clause 9 IV (iv) of NIT.

ii) Assessment of Capacity based on 'AVERAGE ANNUAL TURNOVER':

If the 'value of contracts in hand' across all PS Regions by a contractor is less than the product of "annual average turnover of the Contractor and multiplying factor", then such bidder shall be considered qualified on 'Annual Average Turnover basis'. The 'value of contracts in hand' will be computed by summing up "50% of the annualized awarded value of each contract" unless performance evaluation is not closed in the online CPES.

Based on the performance rating of the Contractor, the above mentioned multiplying factor shall be as below:

Sl. no.	Overall Performance Rating (R_{BHEL})	(Multiplying factor to Average Annual Turnover)
1	≥ 60 and ≤ 70	1
2	> 70 and ≤ 80	2
3	> 80	3

'Assessment of Capacity of Bidder':

The bidder will be considered qualified for the tender if it qualifies on 'Load and Performance basis' as well as on 'Average Annual Turnover basis'.

However, 'New Vendor'/ 'Consortium Partner' shall be considered qualified based on only 'Load and Performance' (they will be regarded pre-qualified on 'Average Annual Turnover' criteria).

IV. Explanatory note:

i). Similar package means Boiler or ESP or Piping or Turbine or Civil or Structure or Electrical or C&I etc. at the individual level irrespective of rating of Plant and irrespective of whether the subject tender is a single package or as part of combined/composite packages. Normally Boiler, ESP, Piping, Turbine, Electrical, C&I, Civil, Structure etc. is considered individual level of package. For example, in case the tendered scope is a Boiler Vertical Package comprising of Boiler, ESP and Power Cycle Piping (i.e. the 'identified packages as per Table-1 below), the 'PERFORMANCE' part against sl.no. II above, needs to be evaluated considering all the identified packages (i.e. Boiler, ESP and Power Cycle Piping) and finally the Bidder's capacity to execute the tendered scope is assessed in line with III above.

ii). Identified Packages (Unit wise)

Table-1

Civil	Electrical and C&I	Mechanical
i). Enabling works	i). Electrical	i). Boiler & Aux (All types including CW Piping if applicable)
ii). Pile and Pile Caps	ii). C&I	ii). Power Cycle Piping/Critical Piping
iii). Civil Works including foundations	iii). Others (Elect. and C&I)	iii). ESP
iv). Structural Steel Fabrication & Erection	iv). Electrical Enabling Works	iv). LP Piping
v). Chimney		v). Steam Turbine Generator set & Aux

vi). Cooling Tower vii). Others (Civil)		vi). Gas Turbine Generator set & Aux vii). Hydro Turbine Generator set & Aux viii). Turbo Blower (including Steam Turbine) ix). Material Management x). FGD xi). ACC xii). Others (Mechanical)

iii). Bidders who have not been evaluated for at least six package months in the last 24 months preceding and including the Cut-off month in the online BHEL system for contractor performance evaluation in BHEL PS Regions, shall be considered "NEW VENDOR".

A 'NEW VENDOR' shall be considered qualified subject to satisfying all other tender conditions.

A 'NEW VENDOR' if awarded a job (of package/packages identified under this clause) shall be tagged as "FIRST TIMER" on the date of first LOI from BHEL.

The "FIRST TIMER" tag shall remain till completion of all the contracts against which vendor has been tagged as First Timer or availability of 6 evaluation scores within last 24 months preceding and including the Cut-off month in the online BHEL system for contractor performance evaluation in BHEL PS Regions.

A Bidder shall not be eligible for the next job as long as the Bidder is tagged as "FIRST TIMER" excepting for the Tenders which have been opened on or before the date of the bidder being tagged as 'FIRST TIMER'.

After removal of 'FIRST TIMER' tag, the Bidder shall be considered 'QUALIFIED' for the future tenders subject to satisfying all other tender conditions including 'Assessment of Capacity of Bidders'.

iv). Consequent upon applying the criteria of 'Assessment of Capacity of Bidders' detailed above on all the bidders qualified against Technical and Financial Qualification criteria, if the number of qualified bidders reduces to less than four, then for further processing of the Tender, BHEL at its discretion reserves the right to also consider the bidders who are "not qualified" as per criteria of 'Assessment of Capacity of Bidders' and for this, procedure described in following three options shall be followed:

a) All the bidders having Overall Performance Rating ('R_{BHEL}') ≥60 shall be considered qualified against criteria of 'Assessment of Capacity of Bidders'.
b) If even after using option "a", the number of qualified bidders remains less than four, then in addition to bidders considered as per option "a", "First timer" bidders having average of available performance scores ≥60 upto and including the Cut Off month shall also be considered qualified against criteria of 'Assessment of Capacity of Bidders'.
c) If even after using option "a" and "b", the number of qualified bidders remains less than four, then in addition to bidders considered as per option "a" and "b", "First timer" bidders for whom no performance score is available in the system upto and including the Cut Off month, shall also be considered qualified against criteria of 'Assessment of Capacity of Bidders'.

Note:- In case, the number of bidders qualified against Technical and Financial Qualification criteria itself is less than four, then all bidders (a)- having Overall Performance Rating ('R_{BHEL}') ≥60, (b)- First timer" bidders having average of available performance scores ≥60 upto and including the Cut Off month, (c)- "First timer" bidders for whom no performance score is available in the system upto and including the Cut Off month, shall be considered qualified against criteria of 'Assessment of Capacity of Bidders' for further processing of tender.

v). 'Under execution' shall mean works in progress as per the following:

a. Up to execution of 90% of anticipated Contract Value in case of Civil, MM, Structural and Turbo Blower Packages
b. Up to Steam Blowing in case of Boiler/ESP/Piping Packages
c. Up to Synchronization in all Balance Packages

Note: BHEL at its discretion can extend (or reduce in exceptional cases in line with Contract conditions) the period defined against (a), (b) and (c) above, depending upon the balance scope of work to be completed.

vi). Contractor shall provide the latest contact details i.e. mail-ID and Correspondence Address to SCT Department, so that same can be entered in the Contractor Performance Evaluation System, and in case of any change/discrepancy same shall be informed immediately. Login Details for viewing scores in Contractor Performance Evaluation System shall be provided to the Contractor by SCT Department.

vii). Performance Evaluation for Activity Month shall be completed in Evaluation Month (i.e. month next to Activity Month) or in rare cases in Post Evaluation Month (i.e. month next to Evaluation Month) after approval from Competent Authority. In case scores are not acceptable, Contractor can submit Review Request to GM Site/ GM Project latest by 27th of Evaluation Month or 5 days after approval of score, whichever is later. However, acceptance/rejection of 'Review Request' solely depends on the discretion of GM Site/GM Project. After acceptance of Review Request, evaluation score shall be reviewed at site and the score after completion of review process shall be acceptable and binding on the contractor.

viii). Project on Hold due to reasons not attributable to bidder -

a. Short hold: Evaluation shall not be applicable for this period, however, Loading will be considered.

b. Long hold: Short hold for continuous six months and beyond or hold on account of Force Majeure shall be considered as Long Hold. Evaluation as well as Loading shall not be considered for this period.

ix). Performance evaluation as specified above in this clause is applicable to Prime bidder and Consortium partner (or Technical tie up partner) for their respective scope of work

10.0 Since the job shall be executed at site, bidders must visit site/ work area and study the job content, facilities available, availability of materials, prevailing site conditions including law & order situation, applicable wage structure, wage rules, etc. before quoting for this tender. They may also consult this office before submitting their offers, for any clarifications regarding scope of work, facilities available at sites or on terms and conditions.

11.0 For any clarification on the tender document, the bidder may seek the same in writing or through e-mail and/or through e-procurement portal https://eprocurebhel.co.in, as per specified format, within the scheduled date for seeking clarification, from the office of the undersigned. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay or any other delays. Any clarification / query received after last date for seeking clarification may not be normally entertained by BHEL and no time extension will be given.

12.0 BHEL may decide holding of pre-bid discussion [PBD] with all intending bidders as per date indicated in the NIT. The bidder shall ensure participation for the same at the appointed time, date and place as may be decided by BHEL. Bidders shall plan their visit accordingly. The outcome of pre-bid discussion (PBD) shall also form part of tender.

13.0 In the event of any conflict between requirement of any clause of this specification/ documents/drawings/data sheets etc. or requirements of different codes/standards specified, the same to be brought to the knowledge of BHEL in writing for clarification before due date of seeking clarification (whichever is applicable), otherwise, interpretation by BHEL shall prevail. Any typing error/missing pages/ other clerical errors in the tender documents, noticed must be pointed out before pre-bid meeting/submission of offer, else BHEL's interpretation shall prevail.

14.0 Unless specifically mentioned otherwise, bidder's quoted price shall deemed to be in compliance with tender including PBD.

15.0 Bidders shall submit Integrity Pact Agreement (Duly signed by authorized signatory who signs in the offer), if applicable, along with techno-commercial bid. This pact shall be considered as a preliminary qualification for further participation. The names and other details of Independent External Monitor (IEM) for the subject tender is as given at point (1) above.

"Integrity Pact (IP)"

(a) IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner. Following Independent External Monitors (IEMs) on the present panel have been appointed by BHEL with the approval of CVC to oversee implementation of IP in BHEL.

Sl. No.	IEM	Email
1.	*Shri Otem Dai, IAS (Retd.)*	iem1@bhel.in
2.	*Shri Bishwamitra Pandey, IRAS (Retd.)*	Iem2@bhel.in
3.	*Shri Mukesh Mittal, IRS (Retd.)*	Iem3@bhel.in

(b) The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with tech-no-commercial bid (Part-I, in case of two/ three part bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.

(c) Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEMs shall be done through email only.

Note:

No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc. on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department's officials whose contact details are provided below:

Details of contact person(s):

Name:	R M Malhotra/ GM (Purchase)	Viveka nand Jha/Manager (Purchase)
Dept:	Purchase Department	
Address:	Floor No. 5 & 6, Shreemohini Complex, 345 Kingsway, Nagpur-440001	
Email:	rmalhotra@bhel.in	Vivekjha@bhel.in
Phone:		9429198214

16.0 The Bidder has to satisfy the Pre-Qualifying Requirements stipulated for this Tender in order to be qualified. The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of satisfying the Pre-Qualification Criteria specified in this NIT as per Annexure-I (as applicable), past performance etc. and date of opening of price bids shall be intimated to only such bidders. BHEL reserves the right not to consider offers of parties under HOLD.

17.0 In case BHEL decides on a `Public Opening', the date & time of opening of the sealed PRICE BID shall be intimated to the qualified bidders and in such a case, bidder may depute one authorized representative to witness the price bid opening. BHEL reserves the right to open 'in-camera' the 'PRICE BID' of any or all Unsuccessful/Disqualified bidders under intimation to the respective bidders.

18.0 Validity of the offer shall be for six months from the latest due date of offer submission (including extension, if any) unless specified otherwise.

19.0 Reverse Auction: "BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) (https://www.bhel.com/guidelines-reverse-auction-2021) for this tender. RA shall be conducted among the techno-commercially qualified bidders.

Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered for RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking."

Note:-

1. No benefits to MSE bidders w.r.t Reverse Auction Guidelines as available on www.bhel.com against works contract.
2. In case of enquiry through e-procurement the sealed electronic price bid (e-bid) is to be treated as sealed envelope price bid.

20.0 On submission of offer, further consideration will be subject to compliance to tender & qualifying requirement and customer's acceptance, as applicable.

21.0 In case the bidder is an "Indian Agent of Foreign Principals", 'Agency agreement has to be submitted along with Bid, detailing the role of the agent along with the terms of payment for agency commission in INR, along with supporting documents.

22.0 The bidders shall not enter into any undisclosed M.O.U. or any understanding amongst themselves with respect to tender.

23.0 ~~Consortium Bidding (or Technical Tie up) shall be allowed only if specified in Pre-Qualifying Requirement (PQR) criteria, and in such a case the following shall be complied with:~~

~~23.1 Prime Bidder and Consortium Partner or partners are required to enter into a consortium agreement for the said contract with a validity period of six months initially. In case bidder becomes L1, Consortium Agreement valid till contractual completion period shall be submitted to BHEL before signing the contract. Consortium Agreement shall be kept valid till scope of work awarded to consortium partner(s) as per contract is completed.~~

~~23.2 'Standalone' bidder cannot become a 'Prime Bidder' or a 'Consortium bidder' or 'Technical Tie up bidder' in a consortium (or Technical Tie up) bidding. Prime bidder shall neither be a consortium partner to other prime bidder nor take any other consortium partners. However, consortium partner may enter into consortium agreement with other prime bidders. In case of non-compliance, consortium bids of such Prime bidders will be rejected.~~

~~23.3 Number of partners for a Consortium Bidding (or Technical Tie up) including Prime Bidder shall be NOT more than 3 (three).~~

~~23.4 Prime Bidder shall be as specified in the Pre-Qualification Requirement, else the bidder who has the major share of work.~~

~~23.5 In order to be qualified for the tender, Prime Bidder and Consortium partner or partners shall satisfy (i) the Technical 'Pre Qualifying Requirements' specified for the respective package, (ii) "Assessment of Capacity of Bidder' as specified in clause 9.0.~~

~~23.6 Prime Bidder shall comply with additional 'Technical' criteria of PQR as defined in 'Explanatory Notes for the PQR'.~~

~~23.7 Prime Bidder shall comply with all other Pre Qualifying criteria for the Tender unless otherwise specified~~

~~23.8 In case customer approval is required, then Prime Bidder and Consortium Partner or partners shall have to be individually approved by Customer for being considered for the tender.~~

~~23.9 Prime Bidder shall be responsible for the overall execution of the contract.~~

~~23.10 In case of award of job, Performance shall be evaluated for Prime Bidder and Consortium Partner or partners for their respective scope of work(s) as per prescribed formats.~~

~~23.11 In case the Consortium partner or partners back out, their SDs shall be encashed by BHEL and BHEL shall take necessary action as per extant guidelines. In such a case, other consortium partner or partners meeting the PQR have to be engaged by the Prime Bidder, and if not, the respective work will be withdrawn and executed on risk and cost basis of the Prime Bidder. The new consortium partner or partners shall submit fresh SDs as applicable.~~

~~23.12 In case Prime Bidder withdraws or insolvency / liquidation / winding up proceedings have been initiated / admitted against the Prime Bidder, BHEL reserves the right to cancel, terminate or short close the contract or take any other action to safeguard BHEL's interest in the Project / Contract. This action will be without prejudice to any other action that BHEL can take under Law and the Contract to safeguard interests of BHEL.~~

~~23.13 After execution of work, the work experience shall be assigned to the Prime Bidder and the consortium partner or partners for their respective scope of work. After successful execution of one work with a consortium partner under direct order of BHEL, the Prime Bidder shall be eligible for becoming a 'standalone' bidder for works similar to that for which consortium partner was engaged, for subsequent tenders.~~

~~23.14 The consortium partner shall submit SD equivalent to 1% of the total contract value in addition to the SD to be submitted by the Prime Bidder for the total contract value. In case there are two consortium partners, then each partner shall submit SD equivalent to 0.5% of the total contract value in addition to the SD to be submitted by the Prime Bidder for the total contract value. However, Prime Bidder has also option for submission of SD on behalf of consortium partner (s).~~

~~SD submitted by Consortium Partner(s) may be released in case corresponding scope of work of the respective Consortium partner(s) has been completed upto the extent of 80% based on certification by Construction Manager and concurrence by the prime bidder.~~

~~23.15 In case of a Technical Tie up, all the clauses applicable for the Consortium partner shall be applicable for the Technical Tie up partner also.~~

24.0 The bidder shall submit/upload documents in support of possession of 'Qualifying Requirements' duly self-certified and stamped by the authorized signatory, indexed and properly linked in the format for PQR. In case BHEL requires any other documents/proofs, these shall be submitted immediately.

25.0 The bidder may have to produce original document for verification if so decided by BHEL.

26.0 The consultant / firm (and any of its affiliates) shall not be eligible to participate in tender(s) for the related works or services for the same project, if they were engaged for the consultancy services.

27.0 Guidelines/rules in respect of Suspension of Business dealings, Vendor evaluation format, Quality, Safety & HSE guidelines, Experience Certificate, etc. may undergo change from time to time and the latest one shall be followed. The abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' is available on www.bhel.com on "**supplier registration page**".

28.0 The offers of the bidders who are on the banned/ hold list and also the offer of the bidders, who engage the services of the banned/ hold firms, shall be rejected. The list of **banned/ hold firms** is available on BHEL web site www.bhel.com.

28.1 Integrity commitment, performance of the contract and punitive action thereof:

28.1.1 **Commitment by BHEL:**

BHEL commits to take all measures necessary to prevent corruption in connection with the tender Process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in a transparent and fair manner, and with equity.

28.1.2 Commitment by Bidder/ Supplier/ Contractor:

(i) The bidder/ supplier/ contractor commit to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India.

(ii) The bidder/ supplier/ contractor will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL.

(iii) The bidder/ supplier/ contractor will perform/ execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business/ money/ reputation, to BHEL.

If any bidder/ supplier/ contractor during pre-tendering/ tendering/ post tendering/ award/ execution/ post-execution stage indulges in mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the prices or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, then, action may be taken against such bidder/ supplier/ contractor as per extent guidelines of the company available on www.bhel.com and / or under applicable legal provisions.

29.0 ~~Micro and Small Enterprises (MSE)~~

~~Any Bidder falling under MSE category, shall furnish the following details & submit documentary evidence/ Govt. Certificate etc. in support of the same along with their techno-commercial offer.~~

~~Type under MSE~~	~~SC/ST owned~~	~~Women owned~~	~~Others (excluding SC/ ST & Women Owned)~~
~~Micro~~			
~~Small~~			

~~Note: - If the bidder does not furnish the above, offer shall be processed construing that the bidder is not falling under MSE category.~~

~~*a)* MSE suppliers can avail the intended benefits in respect of the procurements related to the Goods and Services only (Definition of Goods and Services as enumerated by Govt. of India vide Office Memorandum F. No. 21(8)/2011-MA dtd. 09/11/2016 office of AS & DC, MSME) only if they submit along with the offer, attested copies of either Udyam Registration Certificate or EM-II certificate having deemed validity (five years from the date of issue of acknowledgement in EM-II) or valid NSIC certificate or Udyog Aadhar Memorandum (UAM) & Acknowledgement or EM-II Certificate along with attested copy of a CA certificate (format enclosed as Annexure – 3) where deemed validity of EM-II certificate of five years has expired applicable for the relevant financial year (latest audited). Date to be reckoned for determining the deemed validity will be the last date of Technical Bid submission. Non submission of such documents will lead to consideration of their bids at par with other bidders. No benefits shall be applicable for this enquiry if the above required documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal. Documents should be notarized or attested by a Gazetted officer. Documents submitted by the bidder may be verified by BHEL for rendering the applicable benefits.~~

30.0 The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.

31.0 PREFERENCE TO MAKE IN INDIA:

For this procurement, the local content to categorize a supplier as a Class I local supplier/ Class II local Supplier/Non-Local Supplier and purchase preferences to Class I local supplier, is as defined I Public Procurement (Preference to Make in India), Order 2017 dated 04.06.2020 issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of Part-II bids against this NIT.

31.1 Compliance to Restrictions under Rule 144 (xi) of GFR 2017

I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. The Competent Authority for the purpose of this Clause shall be the Registration Committee constituted by the Department for Promotion of Industry and Internal Trade (DPIIT).

II. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the

descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.

III. "Bidder from a country which shares a land border with India" for the purpose of this Clause means: -
   a. An entity incorporated established or registered in such a country; or
   b. A subsidiary of an entity incorporated established or registered in such a country; or
   c. An entity substantially controlled through entities incorporated, established or registered in such a country; or
   d. An entity whose beneficial owner is situated in such a country; or
   e. An Indian (or other) agent of such an entity; or
   f. A natural person who is a citizen of such a country; or
   g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above.

IV. The beneficial owner for the purpose of (III) above will be as under:
   1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.
      Explanation
         a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent of shares or capital or profits of the company.
         b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements.
   2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership.
   3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person has ownership of or entitlement to more than fifteen percent of the property or capital or profits of the such association or body of individuals.
   4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
   5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

V. An Agent is a person employed to do any act for another, or to represent another in dealings with third person.

VI. The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.

Note:

(i) The bidder shall provide undertaking for their compliance to this Clause, in the Format provided in Annexure-11.

(ii) Registration of the bidder with Competent Authority should be valid at the time of submission as well as acceptance of the bids.

32.0 Bid should be free from correction, overwriting, using corrective fluid, etc. Any interlineation, cutting, erasure or overwriting shall be valid only if they are attested under full signature(s) of person(s) signing the bid else bid shall be liable for rejection.
All overwriting/cutting, etc., will be numbered by bid opening officials and announced during bid opening.

33.0 In the course of evaluation, if more than one bidder happens to occupy L-1 status, effective L-1 will be decided by soliciting discounts from the respective L-1 bidders.

In case more than one bidder happens to occupy the L-1 status even after soliciting discounts, the L-1 bidder shall be decided by a toss/ draw of lots, in the presence of the respective L-1 bidder(s) or their representative(s).

Ranking will be done accordingly. BHEL's decision in such situations shall be final and binding.

34.0 The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/ guidelines.

35.0 Order of Precedence:
In the event of any ambiguity or conflict between the Tender Documents, the order of precedence shall be in the order below:

a. Amendments/Clarifications/Corrigenda/Errata etc. issued in respect of the tender documents by BHEL
b. Notice Inviting Tender (NIT)
c. Price Bid
d. Technical Conditions of Contract (TCC)—Volume-1A
e. Special Conditions of Contract (SCC) —Volume-1B
f. General Conditions of Contract (GCC) —Volume-1C
g. Forms and Procedures —Volume-1D

It may please be noted that guidelines/ circulars/ amendments/ govt. directives issued from time to time shall also be applicable.

For BHARAT HEAVY ELECTRICALS LTD

(General Manager - Purchase)

Enclosure:

1.0 Annexure-1: Pre Qualifying Requirements.
2.0 Annexure-2: Check List.
~~3.0 Annexure-3: Certificate by Chartered Accountant~~

4.0 Annexure-4: Reverse Auction Process Compliance Form
5.0 Annexure-5: Authorization of representative who will participate in the online Reverse Auction Process
6.0 Annexure-6: RA Price Confirmation and Breakup
7.0 Annexure-7: Integrity Pact
8.0 Annexure-8: Undertaking as per PQR C4 of Annexure-1 i.e. PQR
9.0 Annexure-9: Declaration reg. Related Firms & their areas of Activities
10.0 Annexure-10: Declaration regarding minimum local content
11.0 Annexure-11: Declaration regarding compliance to restrictions under rule 144 (xi) of GFR 2017
12.0 Annexure 12: Important information.

01. ANNEXURE - 1

PRE QUALIFYING CRITERIA

E-Tender Spec No: BHE/PW/PUR/LRPT2-CPS/2883	
JOB	SUPPLY, ERECTION & COMMISSIONING OF CONSTRUCTION POWER SUPPLY SYSTEM AT 2x800MW NTPC LARA PROJECT

S No	PRE QUALIFICATION CRITERIA	~~Bidders claim in respect of fulfilling the PQR Criteria~~ Applicability	
A	Submission of Integrity Pact duly signed (if applicable) (~~Note: To be submitted by Prime Bidder & Consortium /Technical Tie up partner jointly in case Consortium bidding is permitted, otherwise by the sole bidder~~)	APPLICABLE	
B	B) Technical PQR Bidder should have executed the similar works* as below in the last seven (7) years as on latest date of bid submission. B.1 B.1.1) Executed One similar work* of value not less than Rs. 360 Lakhs against single work order. (OR) B.1.2) Executed Two similar works* each of value not less than Rs. 225 Lakhs against maximum two work orders. (OR) B.1.3) Executed Three similar works* each of value not less than Rs. 180 Lakhs against maximum three work orders. *Similar Works Definition: 1. Executed (Supply, Erection & Commissioning) / (Erection and Commissioning) of Electrical System / Switchyard / Power Transmission System / Power Distribution System / LT Substation etc. consisting of following systems: a. 1.5MVA or higher capacity Transformer, b. Overhead lines or HT/LT Cabling (OR) 2. Provided Construction Power supply distribution network on 'Build, Own, Operate' basis or 'Lease basis' consisting of following systems: a. 1.5MVA or higher capacity transformer, b. Overhead Lines or HT/LT Cabling	APPLICABLE	
C-1	Financial TURNOVER Bidders must have achieved an average annual financial turnover (audited) of Rs. 135 Lakhs or more over last three Financial Years (FY) i.e. 2020-21, 2021-22 & 2022-23.	APPLICABLE	

C-2	NETWORTH (only in case of Companies) Net worth of the Bidder based on the latest Audited Accounts as furnished for 'C-1' above should be positive.	APPLICABLE	
C-3	PROFIT Bidder must have earned profit in any one of the three Financial Years as applicable in the last three Financial Years as furnished for 'C-1' above.	APPLICABLE	
C-4	Bidder must not be under Bankruptcy Code Proceedings (IBC) by NCLT or under Liquidation / BIFR, which will render him ineligible for participation in this tender, and shall submit undertaking to this effect.	APPLICABLE	
D	**Assessment of Capacity of Bidder to execute the work as per sl no 9 of NIT (if applicable)** Applicable, The "Assessment of Capacity of Bidders" for this Tender shall be carried out by considering the identified packages i.e**. "ELECTRICALS".**	APPLICABLE	BY BHEL
E	Approval of Customer (if applicable) Note: Names of bidders (including consortium/Technical Tie up partners in case consortium bidding is permitted) who stand qualified after compliance of criteria A to D shall be forwarded to customer for their approval	NOT APPLICABLE	BY BHEL
F	Price Bid Opening Note: Price Bids of only those bidders shall be opened who stand qualified after compliance of criteria A to E		BY BHEL
G	Consortium tie-ups	NOT APPLICABLE	

Explanatory Notes for the PQR (unless otherwise specified in the PQR):

Explanatory Notes for PQR B.1 (Technical)

- For the criteria (B.1), actual executed value shall be considered.
- Value of work is to be updated with indices for "All India Avg. Consumer Price index for industrial workers" and "Monthly Whole Sale Price Index for All Commodities" with base month as per last month of work execution and indexed up to three (3) months prior to the month of latest due date of bid submission as per following formula-

$$P = R + 0.425 \times R \times \frac{(X_N - X_0)}{X_0} + 0.425 \times R \times \frac{(Y_N - Y_0)}{Y_0}$$

Where
P = Updated value of work
R = Value of executed work
X_N = All India Avg. Consumer Price index for industrial workers for three months prior to the month of latest due date of bid submission (e.g. If latest bid submission date is 02-Mar-17, then bid submission month shall be reckoned as March'17 and index for Dec'2016 shall be considered).
X_0 = All India Avg. Consumer Price index for industrial workers for last month of work execution
Y_N = Monthly Whole Sale Price Index for All Commodities for three months prior to the month of latest due date of bid submission (e.g. If latest bid submission date is 02-Mar-17, then bid submission

month shall be reckoned as March'17 and index for Dec'2016 shall be considered).

Y_0 = Monthly Whole Sale Price Index for All Commodities for last month of work execution

- The evaluation currency for this tender shall be INR.

Explanatory Notes for Technical Criteria (B2):

1. VOID
2. Unless otherwise specified, for the purpose of "B2 Technical Criteria", the word 'EXECUTED' means achievement of milestones as defined below -
    a. "ACHIEVEMENT OF PHYSICAL QUANTITIES" as per PQRs.
    b. "READINESS FOR COAL FILLING" of at least one Bunker, in respect of Mill Bunker Structure.
    c. "CHARGING" in respect of Power Transformers/ Bus Ducts/ "HT/LT Switchgears" / "HT/LT Cabling".
    d. For C&I works: "SYNCHRONISATION" in case of power project / "WORK EXECUTION of the value as defined in PQR" in case of industry.
    e. "BOILER LIGHT UP" in respect of Boiler / CFBC / ESP.
    f. "CHARGING OF ATLEAST ONE PASS" in respect of ESP(R&M)
    g. "GAS IN" in respect of HRSG.
    h. "STEAM BLOWING" in respect of Power Cycle Piping.
    i. "HYDRAULIC TEST"/ ANY OTHER EQUIVALENT TEST LIKE "100% RT/UT OF WELDED JOINTS" of the system in respect of Pressure parts/ LP Piping/CW Piping.
    j. "FULL LOAD OPERATION OF THE UNIT" in respect of Insulation work.
    k. "SYNCHRONISATION" in respect of STG / GTG.
    l. "SPINNING" in respect of HTG.
    m. "GAS IN" in respect of FGD
3. Boiler means HRSG or WHRB or any other types of Steam Generator.
4. Power Cycle piping means Main Steam, Hot Reheat, Cold Reheat, HP Bypass.
5. For the purpose of evaluation of the PQR, one MW shall be considered equivalent to 3.5 TPH where ever rating of HRSG/BOILER is mentioned in MW. Similarly, where ever rating of Gas Turbine is mentioned in terms of Frame size, ISO rating of the same in terms of MW shall be considered for evaluation.

Explanatory Notes for PQR -C (Financial):

C-1:

i. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as indicated against C-1 above.
ii. Evaluation of Turnover criteria shall be calculated from the Audited Balance Sheet and Profit & Loss Account for the three Financial Years (FY).
iii. In case audited Financial statements have not been submitted for all the three years as indicated against C-1 above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years.
iv. If financial statements are not required to be audited statutorily, then instead of audited financial statements, financial statements are required to be certified by Chartered Accountant.

C-2: Net Worth (Only in case of companies) of the bidder should be positive.

Note: Net worth shall be calculated based on the latest Audited Accounts as furnished for 'C-1' above.

Net worth = Paid up share capital + Reserves

C-3: Bidder must have earned profit in any one of the three financial years as applicable in the last three financial years as furnished for 'C-1' above.

Note: PROFIT shall be PBT earned during any one year of last three financial years as in 'C-1' above.

C-4: Bidder must not be under Bankruptcy Code Proceedings (IBC) by NCLT or under Liquidation / BIFR, which will render him ineligible for participation in this tender, and shall submit undertaking to this effect.

Common Explanatory Notes:

1. For evaluation of PQR, in case Bidder alone does not meet the pre-qualifying technical criteria B1 above, bidder may utilize the experience of its Parent/ Subsidiary Company along with its own experience, subject to following:
   a. The parent company shall have a controlling stake of ≥50% in the subsidiary company (as per Format-1).
   b. The Parent Company/ Subsidiary Company of which experience is being utilized for bidding shall submit Security Deposit(SD) equivalent to 1% of the total contract value
   c. The parent/ subsidiary company and bidder shall provide an undertaking that they are jointly or severally responsible for successful performance of the contract (as per Format-2).
   d. In case Bidder is submitting bid as a Consortium Partner, option of utilizing experience of parent/subsidiary Company can be availed by Prime Bidder only.
   e. Parent Company/ Subsidiary Company of which experience is being used for bidding, cannot participate as a 'Standalone Bidder' or as a 'Consortium bidder'.
2. Completion date for achievement of the technical criteria specified in the 'B' above should be in the last 7 years ending on the 'latest date of Bid Submission' of Tender irrespective of date of the start of work. Completion date shall be reckoned from the " Financial Year quarter of bid submission". (for e.g. -Work completed on 01.01.2014 shall be considered even if latest date of bid submission is 20.03.2021).
3. "Executed" means the bidder should have achieved the technical criteria specified in the Common QR even if the Contract has not been completed or closed.
4. In case the Experience/PO/WO certificate enclosed by bidders do not have separate break up of prices for the E&C portion for Electrical and C&I works (i.e. the certificates enclosed are for composite order for supply and erection of Electrical and C&I and other works if any), then value of Erection & Commissioning for the Electrical and C&I portion shall be considered as 15% of the price for supply & erection of Electrical and C&I.
5. ~~Following shall be complied with in case of consortium:~~
   ~~a. The Prime Bidder and Consortium Partner(s) are required to enter in to a consortium agreement and certify to BHEL regarding existence and validity of their consortium agreement in line with validity period mentioned in NIT.~~
   ~~b. Prime Bidder and Consortium partners shall be approved by Customer for being considered for the tender (applicable if customer approval is required).~~
   ~~c. Number of partners including prime Bidder shall be NOT more than 3 (three).~~

~~d. Prime Bidder alone shall necessarily comply with "B1Technical Criteria" except for mechanical package where B1 criteria is not applicable.~~

~~e. Prime Bidder and Consortium Partner shall together comply with the 'Pre-Qualification Requirements' specified for the respective category of technical requirement as per "B2 technical criteria".~~

~~f. Prime Bidder shall comply with all other Pre Qualifying criteria for the Tender unless otherwise specified.~~

~~g. All other conditions shall be read in conjunction with clause no 23.0 of NIT.~~

~~h. Prime Bidder shall be the Bidder who has a major share of work.~~

~~i. Prime Bidder shall be responsible for the overall execution of the Contract.~~

~~j. Performance shall be evaluated for Prime Bidder and the Consortium partner for their respective scope of work.~~

~~k. In case the Consortium partner backs out, another consortium partner meeting the QRs, has to be engaged by Prime Bidder and if not, the respective work will be withdrawn and executed on risk and cost basis of the prime bidder.~~

~~l. In case Prime Bidder withdraws or insolvency / liquidation / winding up proceedings have been initiated / admitted against the Prime Bidder, BHEL reserves the right to cancel, terminate or short close the contract or take any other action to safeguard BHEL's interest in the Project / Contract. This action will be without prejudice to any other action that BHEL can take under Law and the Contract to safeguard interests of BHEL~~

~~m. After successful execution of one work with a consortium partner under direct orders of BHEL, the Prime Bidder shall be eligible for becoming a 'standalone' bidder for works similar to that for which consortium partner was engaged, for subsequent tenders.~~

~~n. The Consortium partner shall submit SD equivalent to 1% of the total contract value in addition to the SD to be submitted by the Prime Bidder for the total contract value.~~

BIDDER SHALL SUBMIT ABOVE PRE-QUALIFICATION CRITERIA FORMAT, DULY FILLED-IN, SPECIFYING RESPECTIVE ANNEXURE NUMBER AGAINST EACH CRITERIA AND FURNISH RELEVANT DOCUMENT INCLUSIVE OF WORK ORDER AND WORK COMPLETION CERTIFICATE ETC IN THE RESPECTIVE ANNEXURES IN THEIR OFFER.

Credentials submitted by the bidder against "PRE QUALIFYING CRITERIAS" shall be verified for its authenticity. In case, any credential (s) is/are found unauthentic, offer of the bidder is liable to the rejection. BHEL reserves the right to initiate any further action as per extant guidelines for Suspension of Business Dealings.

Format-1

Certificate for relationship between Parent Company / Subsidiary Company and the bidder

To,
.....

.....

Dear Sir,

Sub: Bid for NIT No .....dated..... for "....." (name of the tender).

We hereby certify that M/s..... is Parent Company/ Subsidiary Company of M/s.....(the bidder) and details of equity holding of the Parent Company in Subsidiary Company as on .....(not earlier than seven days prior to the Bid Submission Date) are given as below:

Name of Parent Company	Name of Subsidiary Company	Percentage of Equity Holding of Parent Company in Subsidiary Company

(Insert Name and Signature of Statutory Auditor or practicing Company Secretary of the Bidder)

Format-2

Undertaking from the Parent Company/ Subsidiary Company of the bidder

(On the Letter Head of Parent Company/ Subsidiary Company, as applicable)

From,
Name:
Full Address:

Telephone No.:
E-mail address:
Fax/No.:

To,
.....
.....

Dear Sir,

We refer to the NIT No ..... dated..... for "....." (name of the Tender).

"We have carefully read and examined in detail the NIT/Tender Terms and Conditions, including in particular, Clause .... of the NIT/Tender, regarding submission of an Undertaking, as per the prescribed Format 1 of the NIT/ Tender.

We confirm that M/s.....(the Bidder) has been authorized by us to use our Technical capability for meeting the Technical Criteria as specified in Clause.....of the PQR of the NIT/Tender referred above.

We agree to submit the Security Deposit equivalent to 1% of the total contract value in addition to Security Deposit to be submitted by Bidder as per Clause.....of the NIT/Tender for fulfillment of all obligations in terms of provisions of the contract, in the event of .....(the Bidder) being selected as the Successful Bidder.

We confirm that we along with M/s.....(the bidder), are jointly or severally responsible for successful performance of the contract.
We confirm that our company shall not participate in the above tender as a 'Standalone Bidder' or as a 'Consortium bidder' and also shall not authorize any other bidder to use our Technical capability for the above tender.

All the terms used herein but not defined, shall have the meaning as ascribed to the said terms under the referred NIT/Tender.

Signature of Managing Director/Authorized signatory of Parent/ Subsidiary Company

ANNEXURE - 2

CHECK LIST

NOTE: - Tenderers are required to fill in the following details and no column should be left blank

1	Name and Address of the Tenderer		
2	Details about type of the Firm/Company		
3.a	Details of Contact person for this Tender	Name : Mr/Ms Designation: Telephone No: Mobile No: Email ID: Fax No:	
3.b	Details of alternate Contact person for this Tender	Name : Mr/Ms Designation: Telephone No: Mobile No: Email ID: Fax No:	
4	EMD DETAILS	DD No: Date : Bank : Amount: Please tick (√) whichever applicable:- ~~ONE TIME EMD /~~ ONLY FOR THIS TENDER	
5	Validity of Offer	TO BE VALID FOR SIX MONTHS FROM DUE DATE	
		APPLICABILITY (BY BHEL)	ENCLOSED BY BIDDER
6	Whether the format for compliance with **PRE QUALIFICATION CRITERIA** (ANNEXURE-I) is understood and filled with proper supporting documents referenced in the specified format	Applicable	YES / NO
7	Audited profit and Loss Account for the last three years	Applicable/~~Not Applicable~~	YES/NO
8	Copy of GST & PAN Card	Applicable/~~Not Applicable~~	YES/NO
9	Whether all pages of the Tender documents including annexures, appendices etc. are read understood and signed	Applicable/~~Not Applicable~~	YES/NO
10	Integrity Pact	Applicable/~~Not Applicable~~	YES/NO
11	OFFER FORWARDING LETTER / TENDER SUBMISSION LETTER	Applicable/~~Not Applicable~~	YES/NO
12	Declaration by Authorized Signatory	Applicable/~~Not Applicable~~	YES/NO
13	No Deviation Certificate	Applicable/~~Not Applicable~~	YES/NO

14	Declaration confirming knowledge about Site Conditions	Applicable/~~Not Applicable~~	YES/NO
15	Declaration for relation in BHEL	Applicable/~~Not Applicable~~	YES/NO
16	Non-Disclosure Certificate	Applicable/~~Not Applicable~~	YES/NO
17	Bank Account Details for E-Payment	Applicable/~~Not Applicable~~	YES/NO
18	Capacity Evaluation of Bidder for current Tender	Applicable/~~Not Applicable~~	YES/NO
19	Tie Ups/Consortium Agreement are submitted as per format	~~Applicable~~/Not Applicable	YES/ NO
20	Power of Attorney for Submission of Tender/Signing Contract Agreement ~~Power of Attorney of Consortium Partner~~.	Applicable/~~Not Applicable~~	YES/NO
21	Analysis of Unit rates	Applicable/~~Not Applicable~~	YES/NO
22	Annexure-5: Authorization of representative who will participate in the online Reverse Auction Process	Applicable/~~Not Applicable~~	YES/NO
23	Annexure-6: RA Price Confirmation and Breakup	Applicable/~~Not Applicable~~	YES/NO
24	Annexure-8: Undertaking as per PQR C4 of Annexure-1 i.e. PQR	Applicable/~~Not Applicable~~	YES/NO
25	Annexure-9: Declaration reg. Related Firms & their areas of Activities (x) Other Tender documents as per this NIT.	Applicable/~~Not Applicable~~	YES/NO
26	Annexure-10 Declaration regarding minimum local content	Applicable/~~Not Applicable~~	YES/NO
27	Annexure-11: Declaration regarding compliance to restrictions under rule 144 (xi) of GFR 2017	Applicable/~~Not Applicable~~	YES/NO

NOTE: STRIKE OFF 'YES' OR 'NO', AS APPLICABLE. TENDER NOT ACCOMPANIED BY THE PRESCRIBED ABOVE APPLICABLE DOCUMENTS ARE LIABLE TO BE SUMMARILY REJECTED.

DATE :

AUTHORISED SIGNATORY

(With Name, Designation and Company seal)

~~ANNEXURE-3~~

~~Certificate by Chartered Accountant on letter head~~

~~(applicable upto 31st March'2021 in line with MSME notification no. S.O. 2119 (E), dated 26th June'2020)~~

~~This is to Certify that M/S ....., (hereinafter referred to as 'company') having its registered office at ..... is registered under MSMED Act 2006, (Entrepreneur Memorandum No (Part—II)/ Udyam Registration Certificate No. ..... dtd: ....., Category: (Micro/Small/Medium)).~~

~~Further verified from the Books of Accounts that the investment of the company as per the latest audited financial year..... as per MSMED Act 2006 is as follows:~~

1. ~~**For Manufacturing Enterprises:** Investment in plant and machinery (i.e. original cost excluding land and building and the items specified by the Ministry of Small Scale Industries vide its notification No. S.O.1722(E) dated October 5, 2006:~~
   ~~Rs..... Lacs~~

2. ~~**For Service Enterprises:** Investment in equipment (original cost excluding land and building and furniture, fittings and other items not directly related to the service rendered or as may be notified under the **MSMED** Act, 2006:~~
   ~~Rs..... Lacs~~

3. ~~**For Enterprises** (having EM-II Certificate/ valid NSIC Certificate or Udyog Aadhar Memorandum): Investment in plant and machinery or equipment is Rs..... Lacs and turnover is Rs. ..... Lacs (as notified in MSME notification no. S.O. 2119 (E) dated 26.06.2020)~~

4. ~~**For Enterprises** (having EM-II Certificate/ valid NSIC Certificate or Udyog Aadhar Memorandum): Investment in plant and machinery or equipment is Rs..... Lacs and turnover is Rs. ..... Lacs (as notified in MSME notification no. S.O. 2119 (E) dated 26.06.2020)~~

~~**(Strike off whichever is not applicable)**~~

~~The above investment of Rs .... Lacs is within permissible limit of Rs .....Lacs for ..... Micro / Small/ Medium *(Strike off which is not applicable)* Category under MSMED Act 2006.~~

~~Or~~

~~The enterprise has been graduated upward from its original category (micro/small/medium) (*strike off which is not applicable*), the enterprise shall maintain its prevailing status till expiry of one year from the close of year of registration, as notified vide S.O. No. 2119 (E) dated 26.06.2020 published in the gazette notification dated 26.06.2020 by Ministry of MSME.~~

~~Or~~

~~The enterprise has been reverse-graduated from its original category (micro/small/medium) (*strike off which is not applicable*), the enterprise will continue in its present category till the closure of the financial year and it will be given the benefit of the changed status only with effect from 1st April of the financial year following the year in which such change took place, as notified vide S.O. No. 2119 (E) dated 26.06.2020 published in the gazette notification dated 26.06.2020 by Ministry of MSME.~~

~~Date:~~

~~(Signature)~~

~~Name:~~

~~Membership Number:~~

~~Seal of the Chartered Accountant~~

ANNEXURE-4

Reverse Auction Process Compliance Form

(The bidders are required to print this on their company's letterhead and sign, stamp before RA)

To

- M/s. {*Service provider*
- *Postal address}*

Sub: Agreement to the Process related Terms and Conditions

Dear Sir,

This has reference to the Terms & Conditions for the Reverse Auction mentioned in the RFQ document for {Items} against BHEL enquiry/ RFQ no.{ BHE/PW/PUR/LRPT2-CPS/2883} dt. {…….}
This letter is to confirm that:

1) The undersigned is authorized official/ representative of the company to participate in RA and to sign the related documents.
2) We have studied the Reverse Auction guidelines (as available on www.bhel.com), and the Business rules governing the Reverse Auction as mentioned in your letter and confirm our agreement to them.
3) We also confirm that we have taken the training on the auction tool and have understood the functionality of the same thoroughly.
4) We also confirm that, in case we become L1 bidder, we will FAX/ email the price confirmation & break up of our quoted price as per *Annexure - 6* within two working days (of BHEL) after completion of RA event, besides sending the same by registered post/ courier both to M/s. BHEL and M/s. {*Service provider.}*

We, hereby confirm that we will honor the Bids placed by us during the auction process.

With regards

Signature with company seal
Name:
Company / Organization:
Designation within Company / Organization:
Address of Company / Organization:

Sign this document and FAX/ email it to M/s *{Service provider}* at *{……..}* prior to start of the Event.

ANNEXURE – 5

Authorization of representative who will participate in the on line Reverse Auction Process:

1	NAME OF THE BIDDER	
2	NAME & DESIGNATION OF OFFICIAL	
3	POSTAL ADDRESS (COMPLETE)	
4	TELEPHONE NOS. (LAND LINE & MOBILE BOTH)	
5	E-MAIL ADDRESS	
6	NAME OF PLACE/ STATE/ COUNTRY, WHEREFROM S/HE WILL PARTICIPATE IN THE REVERSE AUCTION	

ANNEXURE – 6

Reverse Auction price confirmation and breakup

(To be submitted by L1 bidder after completion of Reverse Auction)

To

- M/s. *Service provider*
- *Postal address*

CC: M/s BHEL *POWER SECTOR WESTERN REGION, Nagpur*

Sub: Final price quoted during Reverse Auction ~~and price breakup~~

Dear Sir,

We confirm that we have quoted.

Rs. _____(in value) &

_____(in words)

for item(s) covered under tender enquiry No. BHE/PW/PUR/LRPT2-CPS/2883

~~Total price of the items covered under above cited enquiries is inclusive of {*Packing & forwarding, GST, E.D., C.S.T., freight and insurance charges up to {.....} District,{.....} State and Type Test Charges etc., (exclusive of service tax), other as per NIT*}~~

as our final landed prices as quoted during the Reverse Auction conducted today {*date* _____} which will be valid for a period ~~of {___ in nos. & in words ___} days~~. as mentioned in the subject tender.

Yours sincerely,
For _____
Name:
Company:
Date:
Seal:

ANNEXURE-7

INTEGRITY PACT

Between

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House", Siri Fort, New Delhi -110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

and

_____, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for E-Tender Spec No: BHE/PW/PUR/LRPT2-CPS/2883 (Job Description: SUPPLY, ERECTION & COMMISSIONING OF CONSTRUCTION POWER SUPPLY SYSTEM AT 2x800MW NTPC LARA PROJECT).
(hereinafter referred to as "Contract"). The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint panel of Independent External Monitor(s) (IEMs), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1-Commitments of the Principal

1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

1.1.3 The Principal will exclude from the process all known prejudiced persons.

1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

Section 2 -Commitments of the Bidder(s)/ Contractor(s)

2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. The Bidder(s)/ Contractor(s) commits himself to observe the following principles during

participation in the tender process and during the contract execution.

2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he/ she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant Indian Penal Code (IPC) and Prevention of Corruption Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and shall await their decision in the matter.

Section 3 -Disqualification from tender process and exclusion from future contracts

If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process , terminate the contract, if already awarded, exclude from future business dealings and/ or take action as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 4 -Compensation for Damages

4.1 If the Principal has disqualified the Bidder (s) from the tender process before award / order acceptance according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.

4.2 If the Principal is entitled to terminate the Contract according to Section 3, or terminates the Contract in application of Section 3 above , the Bidder(s)/ Contractor (s) transgression through a violation of Section 2 above shall be construed breach of contract and the Principal shall be entitled to demand and recover from the Contractor an amount equal to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee , whichever is higher, as damages, in addition to and without prejudice to its right to demand and recover compensation for any other loss or damages specified elsewhere in the contract.

Section 5 -Previous Transgression

5.1 The Bidder declares that no previous transgressions occurred in the last 3 (three) years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason or action can be taken as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 6 -Equal treatment of all Bidder (s)/ Contractor (s) / Sub-contractor (s)

6.1 The Principal will enter into Integrity Pacts with identical conditions as this Integrity Pact with all Bidders and Contractors.

6.2 In case of Sub-contracting, the Principal Contractor shall take the responsibility of the adoption of Integrity Pact by the Sub-contractor(s) and ensure that all Sub-contractors also sign the Integrity Pact.

6.3 The Principal will disqualify from the tender process all Bidders who do not sign this Integrity Pact or violate its provisions.

Section 7 -Criminal Charges against violating Bidders/ Contractors /Subcontractors

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

Section 8 -Independent External Monitor(s)

8.1 The Principal appoints competent and credible panel of Independent External Monitor (s) (IEMs) for this Integrity Pact. The task of the IEMs is to review independently and objectively, whether and to what extent the parties comply with the obligations under this Integrity Pact.

8.2 The IEMs are not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.

8.3 The IEMs shall be provided access to all documents/ records pertaining to the Contract, for which a complaint or issue is raised before them as and when warranted. However, the documents/records/information having National Security implications and those documents which

have been classified as Secret/Top Secret are not to be disclosed.

8.4 The Principal will provide to the IEMs sufficient information about all meetings among the parties related to the Contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the IEMs the option to participate in such meetings.

8.5 The advisory role of IEMs is envisaged as that of a friend, philosopher and guide. The advice of IEMs would not be legally binding and it is restricted to resolving issues raised by a Bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some Bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.

8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process or during execution of Contract, the matter should be examined by the full panel of IEMs jointly, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.

8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to the CMD, BHEL at the earliest. They may also send their report directly to the CVO, in case of suspicion of serious irregularities requiring legal/ administrative action. Only in case of very serious issue having a specific, verifiable Vigilance angle, the matter should be reported directly to the Commission. IEMs will tender their advice on the complaints within 30 days.

8.8 The CMD, BHEL shall decide the compensation to be paid to the IEMs and its terms and conditions.

8.9 IEMs should examine the process integrity; they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the Principal should be looked into by the CVO of the Principal.

8.10 If the IEMs have reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code / Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the IEMs may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8.11 After award of work, the IEMs shall look into any issue relating to execution of Contract, if specifically raised before them. As an illustrative example, if a Contractor who has been awarded the Contract, during the execution of Contract, raises issue of delayed payment etc. before the IEMs, the same shall be examined by the panel of IEMs. Issues like warranty/ guarantee etc. shall be outside the purview of IEMs.

8.12 However, the IEMs may suggest systemic improvements to the management of the Principal, if considered necessary, to bring about transparency, equity and fairness in the system of procurement.

8.13 The word `Monitor' would include both singular and plural.

Section 9 -Pact Duration

9.1 This Integrity Pact shall be operative from the date this Integrity Pact is signed by both the parties till the final completion of contract for successful Bidder, and for all other Bidders 6 months after the Contract has been awarded. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.

9.2 If any claim is made/ lodged during currency of this Integrity Pact, the same shall be binding and continue to be valid despite the lapse of this Pact as specified above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 -Other Provisions

10.1 This Integrity Pact is subject to Indian Laws and exclusive jurisdiction shall be of the competent Courts as indicated in the Tender or Contract, as the case may be.

10.2 Changes and supplements as well as termination notices need to be made in writing.

10.3 If the Bidder(s)/ Contractor(s) is a partnership or a consortium or a joint venture, this Integrity Pact shall be signed by all partners of the partnership or joint venture or all consortium members.

10.4 Should one or several provisions of this Integrity Pact turn out to be invalid, the remainder of this Integrity Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those bidders / contractors who have entered into this Integrity Pact with the Principal would be competent to participate in the bidding. In other words, entering into this Integrity Pact would be a preliminary qualification.

10.6 In the event of any dispute between the Principal and Bidder(s)/ Contractor(s) relating to the Contract, in case, both the parties are agreeable, they may try to settle dispute through Mediation before the panel of IEMs in a time bound manner. In case, the dispute remains unresolved even after mediation by the panel of IEMs, either party may take further action as the terms & conditions of the Contract. The fees/expenses on dispute resolution through mediation shall be shared by both the parties. Further, the mediation proceedings shall be confidential in nature and the parties shall keep confidential all matters relating to the mediation proceedings including any settlement agreement arrived at between the parties as outcome of mediation. Any views expressed, suggestions, admissions or proposals etc. made by either party in the course of mediation shall not be relied upon or introduced as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the dispute that is the subject of mediation proceedings. Neither of the parties shall present IEMs as witness in any Alternative Dis-

pute Resolution or judicial proceedings in respect of the dispute that was subject of mediation.

For & On behalf of the Principal
(Office Seal)
Place----------
Date----------
Witness: _____
(Name & Address) _____
_____

For & On behalf of the Bidder/ Contractor
(Office Seal)

Witness: _____
(Name & Address) _____
_____

ANNEXURE – 8

UNDERTAKING

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)

To,

GM-PURCHASE, BHEL-PSWR,
Floor No. 5&6, Shri Mohini Complex
345, KINGSWAY, NAGPUR-440001

Dear Sir/Madam,

Sub: DECLARATION REGARDING INSOLVENCY/ LIQUIDATION/ BANKRUPTCY PROCEEDINGS

Ref: NIT/Tender Specification No: BHE/PW/PUR/LRPT2-CPS/2883

I/We,

_____

_ declare that, I/We am/are not under insolvency resolution process or liquidation or Bankruptcy Code Proceedings (IBC) as on date, by NCLT or any adjudicating authority/authorities, which will render us ineligible for participation in this tender.

Sign. of the AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

Place:
Date:

Annexure-9

DECLARATION

Date:_____

To

GM-PURCHASE, BHEL-PSWR,
Floor No. 5&6, Shri Mohini Complex
345, KINGSWAY, NAGPUR-440001

Sub: Details of related firms and their area of activities

Dear Sir/ Madam,

Please find below details of firms owned by our family members that are doing business/ registered for same item with BHEL,_____ (NA, if not applicable).

1	Material Category/ Work Description	
	Name of Firm	
	Address of Firm	
	Nature of Business	
	Name of Family Member	
	Relationship	
2	Material Category/ Work Description	
	Name of Firm	
	Address of Firm	
	Nature of Business	
	Name of Family Member	
	Relationship	
……		

Note: I certify that the above information is true and I agree for penal action from BHEL in case any of the above information furnished is found to be false.

Regards,
(
_____
)

From: M/s _____
Supplier Code: _____
Address: _____
_____
_____

Annexure-10

DECLARATION REGARDING MINIMUM LOCAL CONTENT IN LINE WITH REVISED PUBLIC PROCUREMENT (PREFERENCE TO MAKE IN INDIA), ORDER 2017 DATED 04TH JUNE, 2020 AND SUBSEQUENT ORDER(S)

(To be typed and submitted in the Letter Head of the Entity/Firm providing certificate as applicable)

To,

GM-PURCHASE, BHEL-PSWR,
Floor No. 5&6, Shri Mohini Complex
345, KINGSWAY, NAGPUR-440001

Dear Sir,

Sub: Declaration reg. minimum local content in line with Public Procurement (Preference to Make in India), Order 2017-Revision, dated 04th June, 2020 and subsequent order(s).

Ref : 1) NIT/Tender Specification No: BHE/PW/PUR/LRPT2-CPS/2883,
2) All other pertinent issues till date

We hereby certify that the items/works/services offered by…… *(specify the name of the organization here)* has a local content of _____ % and this meets the local content requirement for 'Class-I local supplier' / 'Class II local supplier' ** as defined in Public Procurement (Preference to Make in India), Order 2017-Revision dated 04.06.2020 issued by DPIIT and subsequent order(s).

The details of the location(s) at which the local value addition is made are as follows:

1. _____ 2. _____
3. _____ 4. _____

…

Thanking you,
Yours faithfully,

(Signature, Date & Seal of
Authorized Signatory of the Bidder)

** - *Strike out whichever is not applicable.*

Note:

1. Bidders to note that above format Duly filled & signed by authorized signatory, shall be submitted along with the techno-commercial offer.
2. In case the bidder's quoted value is in excess of Rs. 10 crores, the authorized signatory for this declaration shall necessarily be the statutory auditor or cost auditor of the company (in the case of companies) or a practising cost accountant or practicing chartered accountant (in respect of suppliers other than companies).

In the event of false declaration, actions as per the above order and as per BHEL Guidelines shall be initiated against the bidder.)

Annexure-11

DECLARATION REGARDING COMPLIANCE TO RESTRICTIONS UNDER RULE 144 (xi) OF GFR 2017

(To be typed and submitted in the Letter Head of the Entity/Firm providing certificate as applicable)

To,

GM-PURCHASE, BHEL-PSWR,
Floor No. 5&6, Shri Mohini Complex
345, KINGSWAY, NAGPUR-440001

Dear Sir,

Sub: Declaration regarding compliance to Restrictions under Rule 144 (xi) of GFR 2017

Ref : 1) NIT/Tender Specification No: BHE/PW/PUR/LRPT2-CPS/2883,
2) All other pertinent issues till date

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries. I certify that _____ *(specify the name of the organization here)*,

(a) is not from such a country / ☐
(b) has been registered with the Competent Authority *(attach valid registration by the Competent Authority, i.e., the Registration Committee constituted by the Dept. for Promotion of Industry and Internal Trade (DPIIT))*; ☐

and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority. *(attach relevant valid registration, if applicable)*

I hereby certify that we fulfil all requirements in this regard and is eligible to be considered.

Thanking you,
Yours faithfully,

(Signature, Date & Seal of
Authorized Signatory of the Bidder)

Note: Bidders to note that in case above certification given by a bidder, whose bid is accepted, is found to be false, then this would be a ground for immediate termination and for taking further action in accordance with law and as per BHEL guidelines.

Annexure-12: IMPORTANT INFORMATION

E -Tender for this work is invited by BHEL PSWR NAGPUR and offer shall be submitted through BHEL e-procurement portal only. All correspondences regarding this tender shall be through E-procurement portal.

Postal Address:
GM /Purchase BHEL PSWR,
SRIMOHINI COMPLEX, Floor No. 5 & 6, 345 KINGSWAY, NAGPUR 440001, INDIA

Following are the concerned BHEL officials to whom bidders can contact in case of any difficulty:

Manager Purchase, Email: vivekjha@bhel.in; Ph+91-9429198214
Manager Purchase, Email: tapishkhandelwal@bhel.in Ph: +91-9010903666
DGM/Purchase, email: kamleshbhel@bhel.in,
GM Purchase, Email: rmalhotra@bhel.in. Ph: +91 – 712 – 2858 – 633

1. Refer the abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' which is available at www.bhel.com on "supplier registration page" at the following link: https://www.bhel.com/sites/default/files/suspension_guidelines_abridged.pdf

2. All Statutory Requirements as applicable for this project shall be complied with.

3. Following clause shall form part of the HSE documents issued under Chapter IX of Volume IB 'Special Conditions of Contract'

   "In case of any financial deduction made by Customer for lapses of safety other than what is provided elsewhere in the contract, the same shall be charged on back-to-back basis on the defaulting contractor without prejudice to any other right spelt anywhere in the tender /contract"

4. BHEL Fraud Prevention Policy: "The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice."

5. ~~"Pradhan Mantri Kaushal Vikas Yojna: The contractor shall, at all stages of work deploy skilled/semi-skilled tradesmen who are qualified and possess certificate in particular trade from CPWD Training Institute/Industrial Training Institute/ National Institute of Construction Management and Research (NICMAR), National Academy of Construction, CIDC or any similar reputed and recognized Institute managed/ certified by State/ Central Government. The number of such qualified tradesmen shall not be less than 20% of total skilled/semi-skilled workers required in each trade at any stage of work. The contractor shall submit number of man days required in respect of each trade, its scheduling and the list of qualified tradesmen along with requisite certificate from recognized Institute to Engineer-in-Charge for approval. Notwithstanding such approval, if the tradesmen are found to have inadequate skill to execute the work of respective trade, the contractor shall substitute such tradesmen within two days of written notice from Engineer-in-Charge. Failure on the part of contractor to obtain approval of Engineer-in-Charge or failure to deploy qualified tradesmen will attract a compensation to be paid by contractor at the rate of Rs.100 per such tradesman per day. Decision of Engineer-in-Charge as to whether particular tradesman possesses requisite skill and amount of compensation in case of default shall be final and binding".~~

6. Bidder to strictly follow all the necessary guidelines issued by Customer, District Magistrate, State Government and Central government to control Pandemic/Epidemic outbreak. The related towards quarantine Centre/Medical expenses etc., if any, shall be in the bidder's scope.

7. Conflict of Interest among Bidders/ Agents:

"A bidder shall not have conflict of interest with other bidders. Such conflict of interest can lead to anti-competitive practices to the detriment of Procuring Entity's interests. ***The bidder found to have a conflict of interest shall be disqualified***. A bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if:

a) they have controlling partner (s) in common; or

b) they receive or have received any direct or indirect subsidy/ financial stake from any of them; or

c) they have the same legal representative/agent for purposes of this bid; or

d) they have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder; or

e) Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components/ sub-assembly/ Assemblies from one bidding manufacturer in more than one bid; or

f) In cases of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One manufacturer can also authorize only one agent/dealer. There can be only one bid from the following:

1. The principal manufacturer directly or through one Indian agent on his behalf; and

2. Indian/foreign agent on behalf of only one principal;

or

g) A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid; or

h) In case of a holding company having more than one independently manufacturing units, or more than one unit having common business ownership/management, only one unit should quote. Similar restrictions would apply to closely related sister companies. Bidders must proactively declare such sister/ common business/ management units in same/ similar line of business."

8. Acceptance of Bank Guarantee (BG)

Revision in Acceptance of Bank Guarantee (BG) Clause no. 1.10.3 (iii) of Vol I C GCC:

Clause No. 1.10.3 (iii) of Vol IC GCC is revised as below: -

"Bank Guarantee issued by:

a. Any of the BHEL consortium bank listed below:

State Bank of India
ABN Amro Bank N.V.
Bank of Baroda
Canara Bank

Citi Bank N.A.
Corporation Bank
Deutsche Bank
HDFC Bank Ltd.
The Hongkond and Shanghai Banking Corporation Ltd
ICICI Bank Ltd.
IDBI Ltd.
Punjab National Bank
Standard Chartered Bank
State Bank of Travancore
State Bank of Hyderabad
Syndicate Bank

b. Any public sector Bank (other than consortium banks) with a clause in the text of Bank Guarantee that "It is enforceable at Nagpur, Maharashtra".

c. Any private sector banks, with a clause in the text of Bank Guarantee that "It is enforceable by being presented at any branch of the bank".

Note: "Bank Guarantees issued by Co-operative Banks are not acceptable".

9. Broad Terms & Conditions of Reverse Auction:

In continuation to Clause 19.0 of NIT (Notice Inviting Tender) following are the broad terms and conditions of Reverse Auction:

"BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) (https://www.bhel.com/guidelines-reverse-auction-2021) for this tender. RA shall be conducted among the techno-commercially qualified bidders.
Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered for RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking."

Note:-

1. *No benefits to MSE bidders w.r.t Reverse Auction Guidelines as available on www.bhel.com against works contract.*
2. *In case of enquiry through e-procurement, the sealed electronic price bid (e-bid) is to be treated as sealed envelope price bid.*
3. *Reverse Auction will be conducted if two or more bidders are techno-commercially qualified. In case of two or three qualified bidders, there shall be no elimination of H1 bidder (whose quote is highest in sealed envelope price bid).* ***In case of four qualified bidders, the H1 bidder shall be eliminated whereas in case of five qualified bidders, H1 & H2 bidders shall be eliminated. However, in case of six or more qualified bidders are available, RA would be conducted amongst first 50% of the bidders arranged in the order of prices from lowest to highest****. Number of bidders eligible for participating in RA would be rounded off to next higher integer value if number of qualified bidders is odd (e.g. if 7 bids are qualified, then RA will be conducted amongst lowest four bidders). However, there will be no elimination of qualified bidders who are MSE or qualifying under PPP-MII, Order 2017, provided their bids are within their respective margin of purchase preference {****presently 15% for MSEs and 20% for PPP-MII****, or as amended from time to time}.*

   In case of multiple H1 bidders, all H1 bidders (except MSEs and bidders qualifying under PPP-MII, Order 2017, who are within the margin of purchase preference) shall be removed provided minimum two bidders remain in fray, else no H1 removal.

10. Bidders kindly to take note that EMD (Earnest Money Deposit) shall be furnished by MSE bidders as well, as per the amount and procedure indicated in the NIT/GCC

11. OVER RUN COMPENSATION: ORC clause no 2.12 of standard GCC shall Not be applicable

12. PRICE VARIATION COMPENSATION:

- Not applicable for Package-A
- Applicable for Package-B
- Clause 2.17.6 of GCC : PRICE VARIATION COMPENSATION is amended as below

Existing clause 2.17.6 of GCC : PRICE VAR-IATION COMPENSATION	Amended clause
Base date shall be calendar month of the 'last date of submission of Tender'.	Base date shall be calendar month of the "date start of work duly certified by BHEL engineer for PKG-B

13. PACKAGES:

For Ease of operation of the scope of work, the subject work is divided in to Two (02) nos. of Packages mentioned hereunder:

a) Package A: Supply, Erection and commissioning of Construction power.

b) Package B: Operation and Maintenance of Construction Power and other ancillaries.

Note:

Package A & B: Each package shall be treated separately. For each item, item rate shall be derived. Payment shall be made on actual execution of work on item rate basis.

14. MODALITY OF AWARD

- LOA for each Package (A & B) shall be issued separately and each Package shall be considered as separate contract with separate contract period (as specified in Chapter-VI "Time Schedule" of TCC), separate start dates and separate contract value etc.
- All the records of the contracts viz Measurement of work, progress monitoring, monthly review, performance evaluation etc. shall be maintained for all the contracts separately.
- Clause of GCC viz SD, LD, ORC, PVC, Time Extension, Retention amount, guarantee period, Quantity variation, final bill etc. shall be applicable for each individual package/contracts.

15. Bidder to take note of the following clauses which have been revised:

- General Conditions of Contract: Clause No. 1.9, 1.10, 2.7, 2.11, 2.13, 2.15.5 2.19, 2.22, 2.24 & 2.27
- Special Conditions of Contract: Clause no: 2.5, 4.2.1.7, 4.2.2.5, 5.14 & 6.1.11

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

TECHNICAL CONDITIONS OF CONTRACT (TCC)
CONTENT

S. No.	DESCRIPTION	Chapter
Vol I A	**Part-I: Contract specific details**	
1	Project Information	Chapter-I
2	Scope of works	Chapter-II
3	Facilities in the scope of Contractor / BHEL (Scope Matrix)	Chapter-III
4	Materials, Consumables, T&Ps and MMEs to be Deployed by Contractor	Chapter-IV
5	T&Ps and MMEs to be deployed by BHEL on sharing basis	Chapter-V
6	Time Schedule	Chapter-VI
7	Terms of Payment	Chapter-VII
8	Taxes and Duties	Chapter-VIII
9	Drawings & Standards Applicable	Chapter-IX
10	Detailed Technical Specifications	Chapter-X
11	Bill of Quantity & Weightages/ Factors	Chapter-XI

1.0 PROJECT INFORMATION

2x800MW NTPC LARA Stage-II is being set up by NTPC Limited with the following particulars.		
S. No.	**Description**	**Details**
1.1	**Location**	Lara Village
1.2	**Nearest Railway Station**	Raigarh Railway Station (30km)
1.3	**Nearest Airport**	Raipur (250 km)
1.4	**Access By Road**	NH-200 (Raigarh–Sarangarh) via Kondatarai through State PWD Road.
1.5	**Major Towns/Cities**	Raigarh (District Headquarter) (30km)

The bidder is advised to visit and examine the site of WORKS and its surroundings and obtain for himself on his own responsibility all information that may be necessary for preparing the bid and entering into the contract. All costs for and associated with site visits shall be borne by the bidder.

2.0 SCOPE OF WORK

The proposed construction power supply network shall have:

a) 01 no. 11/11.5kV Substation consisting of 2 nos. 2.5MVA 11/11.5kV Transformers, 02 nos. 11kV RMU (primary side), 02 nos. 11kV VCBs (secondary side) and other allied works.

b) 12 nos substations of rating 500kVA, 11/0.433kV each. All the substations shall be connected to 11 kV ring main feeder through 11kV Overhead line and underground cables. The number of substations may vary depending on site requirements.

c) Approximately 05km of overhead lines of ring main system for Construction Power.

d) Laying of HT & LT Cables as per the project requirement.

e) 162 Nos. of steel tubular swaged poles, 9-meter-long made of sheet steel for area lighting. Each pole shall have one 90W LED street light.

f) The total work is divided into two different packages:

2.01 PACKAGE - A

- The scope of work of this package covers design of construction power network, supply of items as mentioned in BOQ (actual requirement shall be in line with the design) required for completion of work apart from the BHEL supplied items, further identification of items at stores / yards, checking, reporting the damages if any, taking delivery at storage yard / stores, loading, transportation, unloading at Contractor's stores / working yard, keeping in safe custody in contractor's stores, pre-assembly, calibration, checking, erection, testing and commissioning, & post-commissioning activities obtaining statutory clearances along with the supply of all consumables, tools and tackles, testing instruments, supply of consumables like electrodes, gas, cable dressing materials, HT / LT insulation tapes, tag plates, PVC sleeves for wire marking, lugs, fasteners, paints and its consumables. Deployment of skilled / unskilled manpower, engineers / supervisors, Tools & Plants (T & P), Material handling equipments, testing instruments, returning of un-used materials / items to BHEL stores. The installation and commissioning of all the electrical equipments / items shall conform to the technical requirements specified elsewhere in the tender.
- The scope of Package A also includes Operation and maintenance of construction power distribution system till commencement of contract period of package B.

2.02 PACKAGE - B

- Deployment of minimum 2 (Two) Electricians & minimum 2 (two) Helpers with required T&P per shift for three shifts per day and 1 (One) Supervisor for day shift for the works of operation and maintenance of construction power distribution system which consists of all the components and equipments erected and commissioned under package A. **The man power should be available throughout the year inclusive of all holidays and Sundays.**
- Operation & maintenance of High Masts, Electrical works in BHEL Offices, BHEL Stores, BHEL yards, etc. inside the Main Plant boundary erected and commissioned by other agencies will be part of this package. The Electrical works of storage areas outside the main plant boundary (if any) erected and commissioning by other agencies shall also be covered under this O&M package.
- The scope of O & M work includes identification of items at stores / yards, checking, reporting the damages if any, taking delivery at storage yard / stores, loading, transportation to working yard, pre-assembly, calibration, checking, replacing, testing and commissioning, & post-commissioning activities using vendor's own tools and tackles and testing instruments along with the supply of all consumables like insulation tapes, HT tapes, electrodes, gas, paints, cable dressing materials, tag plates, PVC sleeves etc.

- The supply of faulty parts and spares are excluded from the contractor's scope and will be provided by BHEL free of cost.
- All necessary Hand tools, multi-meters, Megger, earth tester, earthing rods etc. shall be in the contractor's scope. Fire extinguishers supplied under package-A shall be maintained by the contractor till the of end O & M period.
- Any other special tools & tackles required to maintain the System shall be arranged by the contractor.

2.03 BHEL SUPPLIED ITEMS

The following items will be supplied by BHEL (free of cost) for completion of the construction power network:

a) 02Nos. 11/11.5kV 2.5MVA oil filled transformers.
b) 02 Nos. 11kV Ring Main Unit (RMU) to be used at the primary side of the above transformer.
c) 02 Nos. 11kV Vacuum Circuit Breaker (VCB) to be used at the secondary side of the above transformer.
d) 12 Nos. of 11/433kV Package substations (500kVA) comprising of HT switchgears, 11/433kV transformer and LT switchgears. The rating of Package substations may be 250kVA.
e) 17km ACSR DOG conductor for overhead lines.
f) HT (11kV) Cables for Ring Main System and Interconnection of Packages substations and 2.5MVA transformers.
g) LT Cables (1.1kV) for power feed to LT Distribution boards, Offices, High Masts feeder, Interconnection of control system, UPS, etc. as per the project requirement.

2.04 BROAD SCOPE OF WORK:

THE SCOPE OF THE WORK WILL COMPRISE OF BUT NOT LIMITED TO THE FOLLOWING:
(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

a) This work comprises of construction power for 2x800MW NTPC Lara Project. Herein, the customer shall provide 02Nos. of incoming feeders at 11kV switchgears from their existing plant. Power from these feeders to the construction power substation (11/11.5kV) comprising of 02Nos. 11/11.5kV, 2.5MVA transformers, 02Nos. 11kV Ring Main Units (RMU) and 02Nos. 11kV Vacuum Circuit Breakers (VCBs) is in the scope of this work. The power from this construction power substation shall feed the 11kV overhead line to be formed in the form of Ring Main System and shall be used for providing construction power to the complete project with occasional interconnection through underground HT cables at special places like road crossings, etc. 12Nos. Package substations of rating 500kVA, 11/.433 kV shall be fed from this ring main system for further distribution to end consumers. The scope also includes obtaining of statutory clearances for charging of the system.
b) Any other items that are required for completion of construction power supply system but are not explicitly mentioned in the contract are also part of the contract on mutually acceptable rates. Sufficient evidence shall be provided for deriving the rates of these items.
c) Operation and Maintenance of the system as mentioned in Package-B.
d) Agency shall quote for complete Package – A & Package – B. Incomplete bid shall not be acceptable.

2.05 NOTE TO CHAPTER-II:

a) Detailed BOQ with detailed specification of various equipments and items are given in the Chapter – XI: Bill of Quantity & Weightages/ Factor. The rate schedule is the summary of BOQ i.e. consolidated list of BOQ. Contractor shall go through the detailed BOQ with respective rate schedule Id no. and specification before filling the rate in the rate schedule.

b) FOR FURTHER DETAILED SCOPE OF WORKS REFER RELEVANT CHAPTERS IN THIS BOOK.

3.0 SCOPE MATRIX

Sl. No.	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.1	**ESTABLISHMENT**			
3.1.1	**For construction purpose**			
a	Open space for office (as per availability)	Yes		Location will be finalized after joint survey with owner
b	Open space for storage (as per availability)	Yes		Location will be finalized after joint survey with owner
c	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
d	Bidder's all office equipment, office / store / canteen consumables		Yes	
e	Canteen facilities for the bidder's staff, supervisors and engineers etc		Yes	
f	Firefighting equipment like buckets, extinguishers etc		Yes	
g	Fencing of storage area, office, canteen etc of the bidder		Yes	
3.1.2	**For living purpose**			
a	Open space for labour colony (as per availability)		Yes	Contractor has to make his own arrangements for space, shelter and transportation of labors as per their requirement.
b	Labour Colony with internal roads, sanitation, complying with statutory requirements		Yes	
3.2	**ELECTRICITY**			
3.2.1	**Electricity for construction purposes 3 Phase 415/440 V**			**Contractor has to make his own arrangement.**
a	Single point source of 440 V		Yes	
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.2	**Electricity for the office, stores, canteen etc. of the bidder (to be specified whether chargeable or free)**			**Contractor has to make his own arrangement.**
a	Single point source		Yes	

Sl. No.	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.3	**Electricity for living accommodation of the bidder's staff, engineers, supervisors etc**		Yes	**Contractor has to make his own arrangement.**
a	Single point source		Yes	
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.3	**WATER SUPPLY**			
3.3.1	**For construction purposes (to be specified whether chargeable or free)**			**Contractor has to make his own arrangement.**
a	Making the water available at single point		Yes	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.2	**Water supply for bidder's office, stores, canteen etc**			**Contractor has to make his own arrangement.**
a	Making the water available at single point		Yes	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.3	**Water supply for Living Purpose**			**Contractor has to make his own arrangement.**
a	Making the water available at single point		Yes	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.4	**LIGHTING**			**Contractor has to make his own arrangement.**
a	For construction work (supply of all the necessary materials) 1. At office/storage area 2. At the preassembly area 3. At the construction site /area		Yes	
b	For construction work (execution of the lighting work/ arrangements) 1. At office/storage area 2. At the preassembly area 3 At the construction site /area		Yes	

Sl. No.	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
c	Providing the necessary consumables like bulbs, switches, etc during the course of project work		Yes	
d	Lighting for the living purposes of the bidder at the colony / quarters		Yes	
3.5	**COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER**			Contractor has to make his own arrangement.
a	Telephone, fax, internet, intranet, e-mail etc.		Yes	
3.6	**COMPRESSED AIR (wherever required for the work)**		Yes	Contractor has to make his own arrangement.
3.7	**DEMOBILIZATION OF ALL THE ABOVE FACILITIES**		Yes	Contractor has to make his own arrangement.
3.8	**TRANSPORTATION**			Contractor has to make his own arrangement.
a	For site personnel of the bidder		Yes	
b	For bidder's equipments and consumables (T&P, Consumables etc)		Yes	

S. No. 3.9	Description PART II ERECTION FACILITIES	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.9.1	**Engineering works for construction**			Not Applicable
a	Providing the erection/constructions drawings for all the equipment covered under this scope		Yes	In consultation with BHEL
b	Drawings for construction methods		Yes	In consultation with BHEL
c	As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes		Yes	Changes are to be marked in drawing & handover to BHEL on completion of work.
d	Shipping lists etc for reference and planning the activities			NOT APPLICABLE
e	Preparation of site erection schedules and other input requirements		Yes	In consultation with BHEL
f	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments		Yes	In consultation with BHEL
g	Weekly erection schedules based on Sl. No. e		Yes	In consultation with BHEL

S. No.	Description	Scope / to be taken care by		Remarks
3.9	**PART II ERECTION FACILITIES**	**BHEL**	**Bidder**	
h	Daily erection / work plan based on Sl. No. g		Yes	In consultation with BHEL
i	Periodic visit of the senior official of the bidder to site to review the progress so that works is completed as per schedule.		Yes	
j	Preparation of preassembly bay		Yes	
k	Laying of racks for gantry crane if provided by BHEL or brought by the contractor/bidder himself			Not Applicable
L	Arranging the materials required for preassembly		Yes	

3.1 LAND FOR SITE OFFICE

a) To establish a temporary site office, fabrication yard and storage area at the job site, open space will be provided free of charges. Contractor has to make his own arrangements for labour colony.

b) BHEL shall not provide to the contractor any residential accommodation to any of his staff and the contractor has to make his own arrangements.

c) Contractor has to furnish along with their offer, the details of requirements of area of space for his temporary site office, stores / storage shed.

d) Location and area requirement for office / storage sheds / fabrication yard shall be discussed and mutually agreed to.

3.2 CONSTRUCTION WATER

a) Construction water to be arranged by Contractor (Bidder).

3.3 CONSTRUCTION POWER

a) LT Power may be taken from first charged substation as mentioned below.

b) Electricity for construction purpose LT power will be provided by BHEL at one single point on non-chargeable basis. Further distribution of electricity shall be arranged by the contractor at his cost.

c) Any duty, deposit involved in getting the Electricity shall be borne by the bidder. As regards contractor's office shed also all such expenditure shall be borne by the contractor.

d) Provision of distribution of electrical power from the given single central common point to the required places with proper distribution boards, approved cables and cable laying including supply of all materials like cables, switch boards, pipes etc., observing the safety rules laid down by electrical authority of the State / BHEL / their customer with appropriate statutory requirements shall be the responsibility of the tenderer / contractor.

e) BHEL is not responsible for any loss or damage to the contractor's equipment as a result of variations in voltage / frequency or interruptions in power supply.

3.4 MATERIALS / CONSUMABLES TO BE ARRANGED BY THE CONTRACTOR FOR ERECTION AND COMMISSIONING AS PART OF THE SCOPE WITHIN THE QUOTED RATE / PRICE

a) All types of welding electrodes, filler wires, Gases
b) Provision for Temporary Scaffoldings.
c) Insulation tape (HT/LT).
d) Paints required for primer & final coating and for protective coating.
e) Solder wire (Lead) -(60/40)
f) Protocol / Calibration report sheets as per BHEL Format.
g) Panel/ JB sealing compound material (for cable entry from bottom / top of Panel).
h) Materials required for cable dressing (GI / aluminium flats, PVC cable ties etc.).
i) PVC wire marker sleeves and Tag plates
j) Lugs of all size.
k) Anchor fasteners for fixing of frames, GI pipes & LDBs / JBs.

4.0 T&Ps and MMEs TO BE DEPLOYED BY CONTRACTOR

4.1 **The following minimum major (T&P) shall be deployed by the contractor for execution of this contract with in the quoted rate:**

S. No.	Description	Minimum quantity
1	Oil filtering machine with BDV kit	01
2	Man-lifter	01
3	Farana	01
4	Trailer	01

4.2 All the tools & plants required for this scope of work are to be arranged by the contractor within the quoted rates. Necessary accessories for the tools & plants shall also be provided by the contractor.

4.3 **EQUIPMENT/ T&P FOR TESTING & COMMISSIONING:**

The following testing equipment / T&P shall be made available at site by contractor in sufficient number to carry out the job simultaneously in more than one area.

1) Insulation tester:
   a) Motorised megger: 0 - 1000 - 2000 - 5000V, 0 - 25000 M ohms
   b) Hand operated megger: 0.5 kV/1.0 kV/2.5 kV, 200 - 100 M ohm
2) Earth resistance tester: 0 to 1, 10, 100 ohms
3) Torque wrench
4) Voltmeter AC: 0 - 125 - 250 - 625 V
5) Ammeter AC: - 0 - 2A - 10A.
6) Wattmeter AC/DC: 0 - 125 - 250 V 0-5-10A.
7) Multimeter analogue: AC: V 2.5V - 2500V,
   AC: A 100 mA - 10 A, 10A- 200A
   DC- V 25.V - 2500V, DC- A - 50mA - 10A
   Resistance - 0 - 200 M ohms
8) Multimeter - digital:
   Voltages AC&DC: 100mv - 1000V
   Current: 10mA - 10A
   Resistance: 0-20 M ohms
9) Variac - 1 /3 phase - 5A, 15A 3 phase - 10A, 20A.
10) Secondary injection kit - 0-5A.
11) HV Test kit - 50 kV AC 400kVA.
12) Vacuum cleaner.
13) Phase sequence meter - 110V - 450V - 25 to 65Hz.
14) Frequency meter - 0 - 115 - 230 - 4500 - 45 - 601/s.
15) Tong tester - 0 - 5A - 10A, 30A, 60A, 150A - 600A, 500A-1000A.
16) Tachometer etc.
17) mA Source
18) Contact resistance measurement kit
19) Micro ohm meter
20) Air blower.
21) Earth Discharge Rod: Minimum 04Nos.

4.4 **EQUIPMENT / T & P FOR OPERATION AND MAINTENANCE:**

The following testing equipment / T&P shall be made available at site by contractor in sufficient number to carry out the job simultaneously in more than one area.

1) Insulation tester:
   a) Motorised megger - 0 - 1000 - 2000 - 5000V, 0 - 25000 M ohms
   b) Hand operated megger - 0.5 KV/1.0 KV/2.5 KV, 200 - 100 M ohm
2) Multimeter–Digital / analogue:
   AC: 2.5V - 1000V,
   AC: 100 mA - 10A, 10A- 200A
   DC: 25.V - 2500V,
   DC: 50mA - 10A
   Resistance: 0 - 200 M ohms
3) Vacuum cleaner, Aluminium ladder
4) Phase sequence meter - 110V - 450V - 25 to 65Hz.
5) Tong tester - 0 - 5A - 10A, 30A, 60A, 150A - 600A, 500A-1000A.
6) Air blower, earthing rods, Manila ropes for Changing of Disc insulator
7) Tool box set.
8) Man-lifter shall be arranged by the vendor for operation and maintenance of street light poles and any other height works as per requirement.

4.5 **ACCURACY REQUIREMENT OF TESTING INSTRUMENTS**

S. No.	INSTRUMENT / TOOL	RANGE	ACCURACY
1	Power Pack	0 to 50V DC, 3A	± 2%
2	Analog Multimeter	Voltage 2.5 to 2500V AC	± 1.0%
		Current 100 mA to 10A AC	± 2.0%
		Current 250 micro A to 1A DC	± 1.5%
		Resistance upto 100 ohms	± 3.0%
		Voltage 2.5V to 2500V DC	± 1%
3	Digital Multimeter	Voltage 200mV to 1000 V DC	± 1% + 1 digit
		Philips Voltage 200mV to 1000 V AC	± 1% + 1 digit
		Hcl Current 200mA to 20 A AC	± 0.8% + 1 digit
		Philips Current 20 mA to 20 A AC	± 0.8% + 1 digit
		Resistance (Hcl) 2120 200* to 200M*	± 0.5% + 1 digit
		Resistance (Hcl) 2105 200* to 200M*	± 0.25% + 1 digit
		Hcl Voltage 200mA to 750 V	± 0.8% + 1 digit
		Philips Current 20 mA to 20 A DC	± 0.5% + 1 digit
		Hcl Current 200 mA to 010A AC	± 1% + 1 digit
5	Secondary Injection Kit	Upto 5A	± 0.5mA
6	Motor operated Megger	Upto 200 Ohms	± 5% at Centre scale
7	Tongue tester	0/300/600A AC	± 5%
		0 to 300A DC	± 5%
8	Tachometer (Hand held	0 to 4000 rpm	± 5%

S. No.	INSTRUMENT / TOOL	RANGE	ACCURACY
9	Phase Sequence Meter		N/A
10	Three Phase Variac	15 A Capacity	N/A
11	Feeler gauges	300 mm long and 100 mm long	± 2 microns
12	Dial gauges	0 to10mm	± 0.01 mm
13	Hand operated Megger 500V / 1000V	Upto 200 M Ohms	± 5% at Centre Scale ± 10% at end of Scale
14	Motorised Megger 2.5 kV	Upto 1000 M Ohms	± 5% at Centre Scale ± 10% at end of Scale
15	Motorised Megger 2.5 kV	Upto 200 M Ohms	± 5% at Centre Scale ± 10% at end of Scale
16	Earth Resistance tester (Megger)	0 to 1, 10, 100 Ohms	± 5% at Centre Scale range
17	AC tongue Tester	0 to 300A AC	± 3%
18	DC Tongue Tester	0 to 300A DC	± 5%
19	High Voltage test Kit	Upto 50 KV AC	± 10%
		Upto 70 KV DC	± 10%
20	Tacho Generator (Mech)	0 to 4000 rpm	± 0.25%
21	DC Ammeter	0 to 300 A	± 10%
22	DC Voltmeter	0 to 500 V	± 10%
23	Micro ohm meter	10V and 100 V	
24	Primary Injection Kit	0-10000A	
25	Single Phase Variac	0-15 Amps	
26	Motor direction tester		
27	DC Tong Tester (mA)	0-500 mA	
28	Contact resistance tester for breaker contact resistance measurement		
29	Motorised Megger 5kV	10000 M ohms	

4.6 **NOTES FOR THIS CHAPTER:**

a. List of T & Ps and testing equipments are for illustrative purpose only. Any other T & Ps and testing equipments required for successful completion of the scope of the contract shall also be arranged by the contractor within the quoted rates.

b. All testing instruments shall have calibration certificate issued by recognized / accredited agencies.

c. The above instruments / equipment will be sent for testing and calibration wherever from time to time and maintained by contractor as required by BHEL.

d. List of such agencies and periodicity of calibration with calibration certificate required for different instruments will be furnished to BHEL at site.

e. Contractor shall maintain calibration records as per the BHEL format and produce them whenever called for by BHEL Engineers.

f. Contractors shall arrange experienced/ qualified persons for using these calibration instruments at laboratory and also at work spot.

g. Wherever frequent calibration is required, contractor shall arrange adequate number of instruments such that the work does not suffer for want of test instruments.

h. Equipment, vehicles, tools and plants and materials brought to site by the contractor from his resources shall have distinctive identification marks and the contractor shall intimate the description and quantity to BHEL in writing.

i. All construction materials brought by the contractor shall have prior approval regarding quality and quantity by BHEL. The contractor shall also provide without any extra cost necessary enclosure containers and protective materials for proper storage of materials inside while the materials are in their custody, whenever so instructed by the purchaser without any extra cost.

j. No material or equipment or tools etc. shall be taken out of the work-site without the written consent of BHEL.

k. BHEL shall not be responsible for the safety and protection of the materials of the contractor and the contractor shall make his arrangements for proper watch and ward for his materials.

5.0 T&Ps AND MMEs TO BE DEPLOYED BY BHEL ON SHARING BASIS

5.1 Arc Flash Suit.

5.2 No other T & P shall be deployed by BHEL.

6.0 TIME SCHEDULE

6.1 CONTRACT PERIOD FOR Package A

The entire work of erection, testing and commissioning of all electrical components including Supply & Application of Final Painting, as detailed in the Tender Specification shall be completed within 9 months from the date of commencement of work at site. However minimum 11 kV O/H line, 11kV/11.5kV substation, and 11kV O/H line network for charging of 4 nos. of 11kV/433V substation shall be commissioned within 04 months from date commencement of work at site.

6.2 During the total period of contract of package- A, the contractor has to carry out the supply, erection, testing and commissioning activities in a phased manner as required by BHEL and the program of milestone events.

6.3 CONTRACT PERIOD FOR Package B

The operation and maintenance period of the construction power distribution system & yard lighting shall be 44 months from the date of start of commencement of operation and maintenance.

6.4 COMMENCEMENT OF CONTRACT PERIOD of Package A

The date of commencement of contract period shall be the mutually agreed date between the bidder and BHEL engineer to start the work. In case of discrepancy the decision of BHEL engineer is final.

6.5 COMMENCEMENT OF CONTRACT PERIOD of Package B

The date of commencement of contract period shall be the date of acceptance of the commissioning of the Main construction power 11/11.5kV substation & 04 Nos. PSS (11kV/433V) by BHEL Engineer as per original scheme. Till the start of Package-B the contractor has to operate & maintain the Package-B works free of cost within the Package-A rates. In case of discrepancy the decision of BHEL engineer is final.

6.6 MOBILISATION FOR ERECTION, TESTING, COMMISSIOING ETC. of Package A

The activities for erection, testing etc. shall be started as per directions of Construction manager of BHEL. The contractor has to augment his resources in such a manner that following major milestones of erection & commissioning are achieved on specified schedules:

Description	Milestone month for package A
Start of work **(Expected)**	Fifteen days from LOI.
Completion of 11/11.5 kV SS & first 04 substations of 11kV/ 433V.	4 months from start of work
Completion of next 8 substations	8th month
Completion of balance work	9th month

In order to meet above schedule in general, and any other intermediate targets set, to meet customer / project schedule requirements, contractor shall arrange & augment all necessary resources from time to time on the instructions of BHEL.

6.7 MOBILISATION FOR Package B

The contractor has to provide the resources from the first day of commencement of contract period of package B.

6.8 GUARANTEE PERIOD FOR CONTRACTOR SUPPLIED ITEMS under Package -A

The guarantee period of twelve months shall commence from the date of acceptance of BHEL Engineer for start of operation and maintenance (after commissioning) of that particular equipment.

6.9 GUARANTEE PERIOD FOR WORKMANSHIP OF THE CONTRACTOR EXECUTED AND COMMISSIONED ITEMS under Package -A

The guarantee period shall be 12 months from the date of commissioning as certified by the BHEL Engineer.

6.10 The guarantee period of Workmanship for Pkg-B shall be NIL.

7.0 TERMS OF PAYMENT

7.1 **Terms of payment: No advance payment will be made.**

7.2 The progressive payment against monthly running bills for erection, testing and commissioning as per the percentage mentioned below on accepted rate / price of contract value will be released as mentioned below on Pro rata basis (References are from Chapter XI: Bill of Quantity & Weightages/ Factor)

S. No.	Activity / Work Description	% of unit rate
7.2.1	**Preparation of drawings and obtaining statutory clearances etc. (BOQ ref 1.01)**	
7.2.1.1	On completion of route survey and preparation of drawings.	50%
7.2.1.2	On getting of charging clearance from Statutory Authority.	50%
7.2.2	**Supply of Materials (BOQ ref 2.01, 2.02, 2.03 & 2.04)**	
7.2.2.1	On receipt of material, verification of documents and on acceptance at site.	90%
7.2.2.2	On charging of material OR final bill of Package-A.	10%
7.2.3	**Laying of HT / LT cable (BOQ ref 2.06.19, 2.07.01 to 2.07.07, & 2.08.04)**	
7.2.3.1	On laying of cable.	45%
7.2.3.2	Termination of cables with respective equipment.	25%
7.2.3.3	On Charging.	30%
7.2.4	**Laying of 11 kV O/H line (BOQ ref 2.05.01 to 2.05.10, 2.06.01 to 2.06.15 excluding 2.06.02 & 2.06.03)**	
7.2.4.1	On completion of line stringing	45%
7.2.4.2	On completion of end connection	25%
7.2.4.3	On Charging	30%
7.2.5	**Erection and Commissioning of PSS & Main 11/11.5kV substation (BOQ ref 2.05.14 & 2.06.20)**	
7.2.5.1	Construction of foundation plinth for transformer, HT & LT panels, Placement of transformer/ PSS, VCB & RMU (if applicable)	35%
7.2.5.2	Receipt, positioning, end termination of cables and earthing of equipments etc.	25%
7.2.5.3	Fencing, substation flooring, lighting and lightning poles erection etc., as applicable for each substation	20%
7.2.5.4	Testing, Commissioning and charging of each substation	20%
7.2.6	**Erection and testing of Distribution Boards (BOQ ref 2.07.22 & 2.08.06)**	
7.2.6.1	On erection of Distribution boards	65%
7.2.6.2	On charging of Distribution boards	35%
1.7.2.7	**Erection of PSCC/ Steel poles (BOQ ref 2.05.07, 2.05.08, 2.06.02, 2.06.03 & 2.06.18)**	
7.2.7.1	On completion of erection including foundation	65%
7.2.7.2	On completion of line stringing	20%
7.2.7.3	On Charging	15%
7.2.8	**Erection of any other item, not covered above, the terms of payment shall be as follows**	

S. No.	Activity / Work Description	% of unit rate
7.2.8.1	On Erection	65%
7.2.8.2	On Charging	35%

7.3 The dismantling works if any are required with written permission from Construction Manager/ Project Director shall be paid for the erection/ laying/ stringing rate of that item.

7.4 Payment for O&M portion shall be made on submission of monthly running Bills at the quoted/ accepted monthly charges and as certified by BHEL engineer.

8.0 TAXES, DUTIES, LEVIES (Rev 14 dated 09/10/2020)

1. All taxes excluding GST, GST Cess & BOCW Cess but including, Royalties, fees, license, deposits, commission, any State or Central Levy and other charges whatsoever, if any, shall be borne by you and shall not be payable extra.
2. Any increase of the taxes excluding GST, GST Cess & BOCW Cess, at any stage during execution including extension of the contract shall have to be borne by the contractor. Quoted/ accepted rates/ price shall be inclusive of all such requirements. Please note that since GST on output will be paid by BHEL separately as enumerated below, your quoted rates/ price should be after considering the Input Credit under GST law at your end.
3. GST :

   The successful bidder shall furnish proof of GST registration .GST along with Cess (as applicable) legally leviable & payable by the successful bidder as per GST Law, shall be paid by BHEL. Hence Bidder shall not include GST along with Cess (as applicable) in their quoted price.
4. GST charged in the Tax Invoice/Debit note by the contractor shall be released separately to the contractor only after contractor files the outward supply details in GSTR-1 on GSTN portal and input tax credit of such invoice is matched with corresponding details of outward supply of the contractor and has paid the GST at the time of filing the monthly return
5. E-invoicing under GST has been implemented with effect from 1st October 2020 for all the taxable persons having turnover more than the threshold limit in any preceding financial year from 2017-18 onwards. Therefore, for all the taxable persons falling under the purview of E-invoice, it is mandatory to mention a valid unique Invoice Reference No. (IRN) and QR code as generated from E-Invoicing portal of the Government for the purpose of issuing a valid Tax Invoice. Only an E-invoice issued in the manner prescribed under rule 48(4) of CGST Rules shall be treated as valid invoice for reimbursement of GST amount.

   If the successful Bidder is not falling under the purview of E-Invoicing then he has to submit a declaration in that respect along with relevant financial statements.
6. Bidder shall note that the GST Tax Invoice complying with GST Invoice Rules (Section 31 of GST Act & Rules referred there under) wherein the 'Bill To' details will as below:

   BHEL GSTN – As per Annexure -1

   NAME -- Bharat Heavy Electricals Limited

   ADDRESS – Site address
7. Bidder to immediately intimate on the day of removal of Goods (in case of any supply of goods) to BHEL along with all relevant details and a scanned copy of Tax Invoice to below email ids to enable BHEL to meet its GST related compliances :-

Email id ---- to be intimated later on.

In case of delay in submission of the abovementioned documents on the date of dispatch, BHEL may incur penalty /interest for not adhering to Invoicing Rules under GST Law. The same will be liable to be recovered from the successful bidder, if such delay is not attributable to BHEL.

8. In case of raising any Supplementary Tax Invoice (Debit / Credit Note) Bidder shall issue the same containing all the details as referred to in Section 34 read with Rule 53.
9. Bidder shall note that in case GST credit is delayed/ denied to BHEL due to delayed / non receipt of goods and /or tax invoice or expiry of the timeline prescribed in GST Law for availing such ITC, or any other reasons not attributable to BHEL, GST amount shall be recoverable from the vendor along with interest levied / leviable on BHEL, as the case may be.
10. Bidder shall upload the Invoices raised on BHEL in GSTR-1 within the prescribed time as given in the GST Act. Bidder shall note that in case of delay in declaring such invoice in your return and GST credit availed by BHEL is denied or reversed subsequently as per GST Law , GST amount paid by BHEL towards such ITC reversal as per GST law shall be recoverable from the bidder along with interest levied / leviable on BHEL.
11. Way Bill: Successful Bidder to arrange for way bill / e-waybill for any transfer of goods for the execution of the contract.

    The Bidder has to make their own arrangement at their cost for completing the formalities, if required, with Issuing Authorities, for bringing materials, plants & machinery at site for execution of the works under this contract, Road Permit/ Way Bill, if required, shall be arranged by the contractor and BHEL will not supply any Road Permit/ Way Bill for this purpose.
12. New taxes and duties:-Any New taxes & duties, if imposed subsequent to due date of offer submission as per NIT & TCN, by statutory authority during contract period including extension, if the same is not attributable to you, shall be reimbursed by BHEL on production of relevant supporting document to the satisfaction of BHEL. However, you shall obtain prior approval from BHEL before depositing new taxes and duties.

    Benefits and/or abolition of all existing taxes must be passed on to BHEL against new Taxes, if any, proposed to be introduced at a later date.

    In case any new tax/levy/duty etc. becomes applicable after the date of bidder's offer but before opening of the price bid, the bidder must convey its impact on his price duly substantiated by documentary evidence in support of the same before opening of the price bids. Claim for any such impact after opening the price bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.

13. For transportation work, bidder shall declare in his quotation whether he is registered under GST, if yes, whether he intends to claim GST on forward charge basis. In absence of this declaration, BHEL will proceed further with the assumption that bidder intends

not to claim GST on forward charge basis. However, in case of GST registered transporter, the amount to the extent of goods and service tax will be retained till BHEL avails the credit of GST. Further, transporter shall issue tax invoice which inter alia includes gross weight of the consignment, name of the consigner and the consignee, registration number of vehicle in which the goods are transported, details of goods transported, details of place of origin and destination, GSTIN of the person liable for paying tax whether as consigner, consignee or goods transport agency, and also containing other information as mentioned under rule 46.

14. TDS under Income Tax shall be deducted at prevailing rates on gross invoice value from the running bills unless exemption certificate from the appropriate authority/ authorities is furnished.

15. TDS under GST shall be deducted at prevailing rates on applicable value from the running bills.

16. TCS under Income Tax 1961 has been implemented with effect from 1st October 2020 for every seller having turnover more than threshold limit during financial year immediately preceding financial year in which the sale of goods is carried out, who receives any amount as consideration for sale of any goods of the value or aggregate of such value exceeding threshold limit other than export of goods or who is already covered under other provision of section 206C, collect from the buyer, TCS as per applicable rates of the sale consideration exceeding threshold limit subject to following conditions
    i. Buyer shall be as per clause (a) of section 206C- (1H)
    ii. Seller shall be as per clause (b) of section 206C- (1H)
    iii. No TCS is to be collected, if the seller is liable to collect TCS under other provision of section 206C or the buyer is liable to deduct TDS under any provision of the Act and has deducted such amount.

    If Successful Bidder is falling under the purview of TCS then he has to submit a declaration in that respect along with relevant financial statements before the start of work or if bidder is falling under preview of TCS during the work in progress then bidder is compulsorily required to submit relevant financial statement in the beginning of the respective FY.

    For TCS claim, vendor has to submit relevant documents required as per Income Tax Act.

17. Refer Annexure – 2 for BOCW Act & Cess Act.

ANNEXURE-1

State wise GSTIN no.s of BHEL

Sl. No	Projects under state	GSTIN

1	Andhra Pradesh	37AAACB4146P7Z8
2	Bihar	10AAACB4146P1ZU
3	Chhattisgarh	22AAACB4146P1ZP
4	Gujarat	24AAACB4146P1ZL
5	Jharkhand	20AAACB4146P5ZP
6	Madhya Pradesh	23AAACB4146P1ZN
7	Maharashtra	27AAACB4146P1ZF
8	Orissa	21AAACB4146P1ZR
9	Telangana	36AAACB4146P1ZG

ANNEXURE-2

BOCW Act & Cess Act

Bidder may please note that the sub-contractor/bidder of BHEL engaging building or construction worker in connection with building or other construction work, are required to follow the procedures enumerated below:

1. It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.
2. It shall be sole responsibility of the contractor engaging Building Workers in connection with the building or other construction works in the capacity of employer to apply and obtain registration certificate specifying the scope of work under the relevant provisions of the Building and Other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 from the appropriate Authorities.
3. It shall be responsibility of the contractor to furnish a copy of such Registration Certificate within a period of one month from the date of commencement of Work.
4. It is responsibility of the contractor to register under the Building and other Construction Workers' Welfare Cess Act, 1996 and deposit the required Cess for the purposes of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 at such rate as the Central Government may , by notification in the Official Gazette, from time to time specify. However, before registering and deposit of Cess under the Building and other Construction Workers' Welfare Cess Act, 1996, the contractor will seek written prior approval from the Construction Manager.
5. It shall be sole responsibility of the contractor as employer to get registered every Building Worker, who is between the age of 18 to 60 years of age and who has been engaged in any building or other construction work for not less than ninety days during the preceding twelve months as Beneficiary under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996.

6. It shall be sole responsibility of the contractor as employer to maintain all the registers, records, notices and submit returns under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.
7. It shall be sole responsibility of the contractor as employer to provide notice of poisoning or occupation notifiable diseases, to report of accident and dangerous occurrences to the concerned authorities under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the rules made thereunder and to make payment of all statutory payments & compensation under the Employees' Compensation Act, 1923.
8. It shall be the responsibility of the sub-contractor as employer to make payment/deposit of applicable cess amount on the extent of work involving building or construction workers engaged by the sub-contractor within a period of one month from the receipt of payment. It shall also be responsibility of the Contractor to furnish BHEL on monthly basis, Receipts/ Challans towards Deposit of the Cess under the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder along with following statistics :
   (i)Number of Building Workers employed during preceding one month.
   (ii) Number of Building workers registered as Beneficiary during preceding one month.
   (iii)Disbursement of Wages made to the Building Workers for preceding wage month.
   (iv) Remittance of Contribution of Beneficiaries made during the preceding month
9. BHEL shall reimburse the contractor the Cess amount deposited for the purposes of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 under the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder. However, BHEL shall not reimburse the Fee paid towards the registration of establishment, fees paid towards registration of Beneficiaries and Contribution of Beneficiaries remitted.
10. It shall be responsibility of the Building Worker engaged by the Contractor and registered as a beneficiary under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 to contribute to the Fund at such rate per mensem as may be specified by the State government by notification in the Official Gazette. Where such beneficiary authorizes the contractor being his employer to deduct his contribution from his monthly wages and to remit the same, the contractor shall remit such contribution to the Building and other construction Workers' Welfare Board in such manner as may be directed by the Board , within the fifteen days from such deduction.
11. Bidders may please note that though the quoted price is exclusive of BOCW (which will be reimbursed by BHEL as per sub-clause 9 above) , however, If at any point of time during the contract period, non-compliance of the provisions of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder is observed, BHEL reserves the right to deduct the applicable cess (1%)

on the contract value and penalty (if any, imposed by Cess Authorities) from the payables on account of non-compliance.

12. The contractor shall declare to undertake any liability or claim arising out of employment of building workers and shall indemnify BHEL from all consequences / liabilities / penalties in case of non-compliance of the provisions of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.

9. STANDARDS APPLICABLE

9.1 All equipment and materials shall be designed, manufactures and tested in accordance with the latest applicable Indian Standards (IS) except where modified and / or supplemented by this specification.

9.2 Equipment and materials conforming to any other standard which ensures equal or better quality may be accepted. In such case, copies of the English version of the standard adopted shall be submitted along with the bid.

9.3 The electrical installation shall meet the requirement of Indian Electricity Rules as amended up to dates, relevant IS codes of Practice and Indian Electricity Act. In addition, other rules or regulations applicable to the work shall be followed. In case of any discrepancy, the more restrictive rule shall be binding. A list of applicable standards is given below for reference.

S. No.	List of IS applicable	Description
1	IS: 10028: 1981 (Part-II & III)	Code of practice for Installation and maintenance of transformers (superseding IS: 1886)
2	IS: 10322: 1982 (Part-I)	Luminaires General Requirements
3	IS: 10322: 1982 (Part-II)	Luminaires Constructional Requirements
4	IS: 10322: 1984 (Part-III)	Luminaires Screw and screwless terminals
5	IS: 10322: 1984 (Part-IV)	Luminaires Methods of tests
6	IS: 10322: 1985 (Part-V) Sec-I	Luminaires Particular requirements Section 1 General purpose luminaires
7	IS: 10322: 1985 (Part-V) Sec-II	Luminaires Particular Requirements Section 2 Recessed Luminaires
8	IS: 10322: 1987 (Part-V) Sec-III	Luminaires Particular requirements Section 3 Luminaires for road and street lighting (superseding IS:2149)
9	IS: 10322: 1987 (Part-V) Sec-IV	Luminaires Particular requirements Section 4 Portable general purpose luminaires
10	IS: 10322: 1987 (Part-V) Sec-V	Luminaires Particular requirements Section 5 Flood light (superseding IS 1947)
11	IS: 104: 1979: (Second Revision)	Ready mixed paint, brushing, zinc chrome, priming
12	IS: 11171: 1985	Dry type power transformers
13	IS: 1180: 1989 (Part-I,II)	Outdoor type three phase distribution transformers up to and including 100kVA 11kV
14	IS: 1248: 2003 (Part I to IX)	Electrical measuring instruments and their accessories
15	IS: 1255: 1983	Code of practice for installation and maintenance of power cables up to and including 33kV rating
16	IS: 13118: 1991	Specification for High Voltage Alternating Current Circuit Breakers
17	IS: 13234: 1992	Guide for short circuit current calculation in three phase AC systems

18	IS: 13947: 2004 (Part-V)	Low voltage switchgear and control gear: Control circuit devices and switching elements
19	IS: 1445: 1977	Porcelain insulators for overhead lines with a nominal voltage up to and including 1000 V
20	IS: 15086: 2001 (Part-I)	Nonlinear resistor type gapped surge arresters for AC systems.
21	IS: 15086: 2001 (Part-V)	Surge Arresters selection and application recommendations.
22	IS: 15086: 2003 (Part-III)	Artificial Pollution Testing of Surge Arresters
23	IS: 15505: 2004	HCFC Blend- A Fire Extinguishing System
24	IS: 1554 (Part-I): 1988	PVC insulated (Heavy duty) electric cables for working voltages up to & including 1100 volts (Third Revision)
25	IS: 1554 (Part-II): 1988	PVC insulated (Heavy duty) electric cables for working voltages from 3.3kV up to & including 11kV (second Revision)
26	IS: 15652: 2006	Insulating Mats for Electrical Purposes - Specification
27	IS: 1678: 1998	Specification for pre-stressed concrete poles for overhead power, traction and telecommunication lines
28	IS: 1866: 2000	Electrical maintenance & supervision of mineral insulating oil in equipment (Third Revision)
29	IS: 1885: 1961 (Part-I)	Fundamental Definition
30	IS: 1885: 1966 (Part-XI)	Electrotechnical Vocabulary Electrical Measurement
31	IS: 1885: 1971 (Part-XXX)	Electrotechnical Vocabulary Overhead Transmission Line and distribution of electrical energy
32	IS: 1885: 1992 (Part-IX)	Electrotechnical Vocabulary: Electrical Relays
33	IS: 1885: 1993 (Part-LIV)	Electrotechnical Vocabulary Insulators
34	IS: 1885: 1993 (Part-LXXVII)	Electrotechnical Vocabulary Overhead Lines
35	IS: 1885: 1993 (Part-LXXXI)	Electrotechnical Vocabulary electrical measuring instruments
36	IS: 1885: 1993 (Part-XXVIII)	Electrotechnical Vocabulary Instrument Transformers
37	IS: 1885: 1993 (Part-XXXVIII)	Electrotechnical Vocabulary Power Transformers and Reactors
38	IS: 1885: 2008 (Part-X)	Electrotechnical Vocabulary Electrical power system protection
39	IS: 2026: 1977 (Part-I)	Power Transformers General
40	IS: 2026: 1977 (Part-II)	Power Transformers Temperature rise
41	IS: 2026: 1977 (Part-IV)	Power Transformers Terminal marking, tappings and connections.
42	IS: 2026: 1981 (Part-III)	Power transformers Insulation level and dielectric tests
43	IS: 2026: 1994 (Part-V)	Power Transformers/Reactor bushings minimum external clearance in air specification
44	IS: 2099: 1986	Bushings for alternating voltages above 1000 V

45	IS: 2121: 1981 (Part-I)	Conductors and earth wire accessories for overhead power lines Armour rods, binding wires and tapes for conductors
46	IS: 2121: 1981 (Part-II)	Conductors and earth wire accessories for overhead power lines Mid span joints and repair sleeves for conductors
47	IS: 2121: 1991 (Part-II)	Conductors and earth wire accessories for overhead power lines Non tension joints
48	IS: 2121: 1992 (Part-II)	Conductors and earth wire accessories for overhead power lines Accessories for earth wire
49	IS: 2171: 1976	Portable fire extinguishers, dry powder (cartridge type)
50	IS: 2486: 1974 (Part-III)	Insulator fittings for overhead power lines with nominal voltage greater than 1000V Locking Devices
51	IS: 2486: 1981 (Part-IV)	Insulator fittings for overhead power lines with nominal voltage greater than 1000V Tests for Locking Devices
52	IS: 2486: 1989 (Part-II)	Insulator fittings for overhead power lines with nominal voltage greater than 1000V Dimensional requirements
53	IS: 2486: 1993 (Part-I)	Metal fittings of insulators for overhead power lines with nominal voltage greater than 1000V General Requirements and tests.
54	IS: 2544:1973	Porcelain post insulators for systems with nominal voltage greater than 1000 Volts.
55	IS: 2675: 1983	Enclosed distribution fuseboards and cutouts for voltages not exceeding 1000 V Ac and 1200 V Dc
56	IS: 2705: 1992 (Part-I)	Current Transformers General Requirements
57	IS: 2705: 1992 (Part-II)	Current Transformers Measuring Current Transformers
58	IS: 2705: 1992 (Part-III)	Current Transformers Protective Current Transformers
59	IS: 2705: 1992 (Part-IV)	Current Transformers Protective Current Transformers for special purpose applications.
60	IS: 2878: 2004	Fire Extinguisher, Carbon Dioxide Type (Portable and Trolley Mounted) – Specification
61	IS: 2932: 2003 (First Revision)	Enamel, Synthetic, Exterior (a) Undercoating (b) Finishing – Specification
62	IS: 3043: 1987	Code of practice for earthing
63	IS: 3070: 1993	Lightning Arresters for Alternating Current Systems - Specification - Part 3 Metal Oxide Lightning Arresters Without Gaps
64	IS: 3156: 1992 (Part-I)	Voltage Transformers General Requirements
65	IS: 3156: 1992 (Part-II)	Voltage Transformers Measuring Voltage Transformers
66	IS: 3156: 1992 (Part-III)	Voltage Transformers Protective Voltage Transformers
67	IS: 3156: 1992 (Part-IV)	Voltage Transformers Capacitor Voltage Transformers
68	IS: 3188: 1980	Characteristics of String Insulator Units
69	IS: 3347: 1965	HV Porcelain Bushing for transformer
70	IS: 335: 1993	New Insulating Oils
71	IS: 3427: 1997	A.C. Metal Enclosed Switchgear and Controlgear for Rated Voltages Above 1 kV and Up to and Including 52 kV
72	IS: 3637: 1966	Gas operated relays

73	IS: 3639: 1966	Specification for Fittings and Accessories for Power Transformers
74	IS: 3961: 1967 (Part-I)	Recommended current ratings for cables: Part 1 Paper insulated lead sheathed cables
75	IS: 3961: 1967 (Part-II)	Recommended current ratings for cables: Part 2 PVC insulated and PVC sheathed heavy duty cables
76	IS: 3961: 1968 (Part-III)	Recommended current ratings for cables: Part 3 Rubber insulated cables
77	IS: 3961: 1968 (Part-V)	Recommended current ratings for cables: Part 5 PVC insulated light duty cables
78	IS: 398: 1976 (Part-III)	Aluminium conductors for overhead transmission purposes: Part 3 Aluminium conductors, aluminized steel reinforced
79	IS: 398: 1994 (Part-IV)	Aluminium conductors for overhead transmission purposes: Part 4 Aluminium alloy stranded conductors (aluminium magnesium silicon type)
80	IS: 398: 1996 (Part-I)	Aluminium conductors for overhead transmission purposes: Part 1 Aluminium stranded conductors
81	IS: 398: 1996 (Part-II)	Aluminium conductors for overhead transmission purposes: Part 2 Aluminium conductors, galvanized steel reinforced
82	IS: 4012: 1967	Specification for Dust-proof Electric Lighting Fittings
83	IS: 4013: 1967	Dust-tight electric lighting fittings
84	IS: 4257: 1981 (Part-I)	Dimensions for Clamping Arrangements for Porcelain Transformer Bushings - Part 1 : For 12 kV to 52 kV Bushings
85	IS: 4770: 1991	Rubber Gloves - Electrical Purposes - Specification
86	IS: 5: 2007	Colours for Ready Mixed Paints and Enamels
87	IS: 5216: 1982 (Part-I)	Recommendations on Safety Procedures and Practices in Electrical Work - Part I General
88	IS: 5216: 1982 (Part-II)	Recommendation on Safety Procedures and Practices in Electrical Work - Part II Life Saving Techniques
89	IS: 5613: 1985 (Part-I) Sec-I	Code of Practice for Design, Installation and Maintenance of Overhead Power Lines - Part 1 Lines Up to and Including 11 kV - Section 1 Design
90	IS: 5613: 1985 (Part-I) Sec-II	Code of practice for design, installation and maintenance of overhead power lines Part 1 Lines up to and including 11 kV, Section 2 Installation and maintenance
91	IS: 5613: 1985 (Part-II) Sec-I	Code of practice for design, installation and maintenance of overhead power lines Part 2 Lines above 11 kV and up to and including 220 kV, Section 1 Design
92	IS: 5613: 1985 (Part-II) Sec-II	Code of practice for design, installation and maintenance of overhead power lines Part 2 Lines above 11 kV and up to and including 220 kV, Section 2 Installation and maintenance
93	IS: 5819: 1970	Recommended Short-circuit Ratings of High Voltage PVC Cables
94	IS: 6103: 1971	Method of test for specific resistance (resistivity) of electrical insulating liquids
95	IS: 6262: 1971	Method of Test for Power Factor and Dielectric Constant of Electrical Insulating Liquids

96	IS: 6600: 1972	Guide for loading of oil immersed transformers
97	IS: 6792: 1992	Method for Determination of Electric Strength of Insulating Oils
98	IS: 694: 1990	PVC Insulated cables for working voltages upto and including 1100 V
99	IS: 731: 1971	Porcelain insulators for overhead power lines with a nominal voltage greater than 1000 V
100	IS: 732: 1989	Code of Practice for Electrical Wiring Installations
101	IS: 800: 2007	General Construction in Steel - Code of Practice
102	IS: 8130: 1984	Conductors for insulated electric cables and flexible cords
103	IS: 8270: 1976: (Part-I)	Guide for preparation of diagrams, charts and tables for electrotechnology: Part 1 Definitions and classification
104	IS: 8270: 1976: (Part-II)	Guide for preparation of diagrams, charts and tables for electrotechnology: Part 2 Item designation
105	IS: 8270: 1976: (Part-V)	Guide for preparation of diagrams, charts and tables for electrotechnology: Part 5 Interconnection diagrams and tables
106	IS: 8270: 1977: (Part-III)	Guide for preparation of diagrams, charts and tables for electrotechnology: Part 3 General requirements for diagrams
107	IS: 8270: 1977: (Part-IV)	Guide for preparation of diagrams, charts and tables for electrotechnology: Part 4 Circuit diagrams
108	IS: 8270: 1983: (Part-VI)	Guide for preparation of diagrams, charts and tables for electrotechnology: Part 6 Unit wiring diagrams and tables
109	IS: 8623: 1993: (Part-I)	Specification for Low-Voltage Switchgear and Controlgear Assemblies - Part 1 : Requirements for Type-Tested and Partially Type-Tested Assemblies
110	IS: 8623: 1993: (Part-II)	Specification for Low-voltage Switchgear and Controlgear Assemblies - Part 2 : Particular Requirements for Busbar Trunking Systems (Busway
111	IS: 8623: 1993: (Part-III)	Specification for Low-Voltage Switchgear and Controlgear Assemblies - Part 3 : Particular Requirements for Equipment Where Unskilled Persons have Access for Their Use
112	IS: 9920: 1982: (Part-III)	Specification for Alternating Current Switches for Voltages Above 1 000 V - Part III Design and Construction
113	IS: 9920: 1985: (Part-IV)	Specification for Alternating Current Switches for Voltages Above 1000 V - Part 4 Type Tests and Routine Tests
114	IS: 9920: 2001: (Part-II)	High-voltage Switches - Specification - Part 2 High-voltage Switches for Rated Voltages of 52 kV and Above
115	IS: 9920: 2002: (Part-I)	High Voltage Switches - Part 1 Switches for Rated Voltages Above 1 kV and Less Than 52 kV
116	IS: 9921: 1981: (Part-I)	Specification for Alternating Current Disconnectors (Isolators) and Earthing Switches for Voltages Above 1 000 V - Part I General and Definitions
117	IS: 9921: 1982: (Part-II)	Alternating current disconnectors (isolators) and earthing switches for voltages above 1000 V Part 2 Rating
118	IS: 9921: 1982: (Part-III)	Specification for Alternating Current Disconnectors (Isolators) and Earthing Switches for Voltages Above 1000 V - Part III Design and Construction

119	IS: 9921: 1985: (Part-IV)	Specification for Alternating Current Disconnectors (isolators) and Earthing Switches for Voltages Above 1000 V - Part 4 Type Tests and Routine Tests
120	IS: 9921: 1985: (Part-V)	Specification for Alternating Current Disconnectors (Isolators) and Earthing Switches for Voltages Above 1 000 V - Part 5 Information to be Given with Tenders, Enquiries and Orders
121	IS: 9974: 1981: (Part-I)	High pressure sodium vapour lamps - Part 1 General requirements and tests
122	IS: 9974: 1981: (Part-II)	High pressure sodium vapour lamps - Part 2 Standard lamp data sheets

9.4 In addition to the standards mentioned above, all works shall conform to the requirements of the following rules and regulations.

a. Indian Electricity Act and Rules framed thereunder
b. Fire insurance regulations
c. Regulations laid down by the Chief Electrical Inspector of State and CEA
d. Regulations laid down by the Factory Inspector of State
e. Any other regulations laid down by the authorities.

9.5 In case any clause of contradictory nature arises between standards and this specification, the latter shall prevail.

ADDITIONAL DRAWINGS ATTACHED. (Attached Separately as Vol-1-E)

1. Drawing No.: PE-DG-508-100-M001 REV00 (PLOT PLAN)
2. Drawing No.: 9587-999-POE-F-00C REV00 (Tentative SLD for construction power)

DETAILED TECHNICAL SPECIFICATIONS

10.1 GENERAL

10.1.1 Identification of equipment at storage yard, technical assistance for checking and making the shortage/ damage reports, taking delivery at storage yard and pre-assembly of equipment wherever required, erecting the equipment, aligning, fastening, supporting, cleaning, checking and carrying out statutory tests as required, trial operation, pre-commissioning, commissioning and post-commissioning activities up to the time of completion of commissioning activities using their tools and tackles and testing instruments along with the supply of all consumables.

10.1.2 Scope of work covered under this specification requires quality workmanship, engineering and construction management. The contractor shall ensure timely completion of work. The contractor shall have adequate tools, measuring instruments, calibrating equipment etc. in his possession. He shall also have adequate trained, qualified and experienced engineers, supervisory staff and skilled personnel. The manpower deployment identified by contractor shall match with above scope of works.

10.1.3 If any item or equipment not covered in this tender but requires erecting / commissioning, the same shall be carried out by the contractor. Equivalent unit rate for those item or equipment shall be considered wherever possible from the BOQ / rate schedule. The rates quoted by the contractor shall be uniform as far as possible for similar items appearing in rate schedule.

10.1.4 Receipt of materials / component to be erected by the contractor, loading and transportation from the storage yard to the project site, stacking, storage and preservation are part of this scope.

10.1.5 Fabrication and installation of steel supports wherever required.

10.1.6 It is not the intent to specify herein all details of material. Any item related to this work, not covered by this scope but necessary to complete the system will be deemed to have been included in the scope of the work.

10.1.7 Deployment of skilled/ unskilled manpower, engineers/ supervisors, Tools & Plants (T & P), Material handling equipment, testing instruments, returning of un-used materials/ items to BHEL stores. The installation and commissioning of all the electrical equipments / items shall conform to the technical requirements specified elsewhere in the tender.

10.1.8 Site testing wherever required shall be carried out for all items / materials installed by the contractor to ensure proper installation and functioning in accordance with drawings, specifications and manufacturer's recommendations.

10.1.9 The contractor shall carry out testing, pre-commissioning, commissioning and trial run of the connected equipment under overall guidance of BHEL and shall locate any cause of malfunction and rectify the same for proper operation. Testing shall also include any additional tests, which the Engineer feels necessary because of site conditions and also to meet system specification.

10.1.10 The work shall be executed under the usual conditions without affecting power plant construction and in conjunction with other operations and contracting agencies at site. The contractor and his personnel shall co-operate with the personnel of other agencies, co-ordinate his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.

10.1.11 All the work shall be carried out as per instructions of BHEL engineer. BHEL engineer's decision regarding the correctness of the work and method of working shall be final and binding on the contractor.

10.1.12 Contractor shall supply and erect all items / materials etc. as per sequence prescribed by BHEL at site. BHEL engineer depending upon the availability of materials / work

fronts etc will decide the sequence of erection / commissioning methodology. No claims for extra payment from the contractor will be entertained on the grounds of deviation from the methods of erection / commissioning adopted in erection/ commissioning of similar job or for any reasons whatsoever.

10.1.13 During the course of erection, testing and commissioning of electrical work, certain rework / modification / rectification / repairs / fabrication etc. may be necessary on account of feedback from other power stations and site operation / maintenance requirements. Contractor shall carryout such rework / modification / rectification / fabrication / repairs etc, promptly and expeditiously.

10.1.14 The contractor will be responsible for the safe custody and proper accounting of all materials in connection with the work. If the contractor has drawn materials in excess of design requirements, recoveries will be effected for such excess drawals at the market rate.

10.1.15 After completing all the works, contractor shall hand over all remaining extra materials with proper identification tags in a packed condition to BHEL stores. In case of any use over actual design requirements, BHEL reserves the right to recover the cost of material used in excess or misused. Decision of BHEL engineer in this regard will be final and binding on the contractor.

10.1.16 Contractor shall, transport all materials to site and unload at site / working area, or pre-assembly yard for inspection and checking. All material handling equipment required shall be arranged by the contractor.

10.1.17 The contractor must obtain the signature and permission of the security personnel of the customer for bringing any of their materials inside the site premises. Without the Entry Gate Pass these materials will not be allowed to be taken outside.

10.1.18 Contractor shall retain all T&P / Testing instrument / Material handling equipments etc at site as per advice of BHEL engineer and same shall be taken out from site only after getting the clearances from engineer in charge.

10.1.19 The contractor at his cost shall arrange necessary security measures for adequate protection of his machinery, equipment, tools, materials etc. BHEL shall not be responsible for any loss or damage to the contractor’s construction equipment and materials. The contractor may consult the Engineer-in-Charge on the arrangements made for general site security for protection of his machinery equipment tools etc.

10.1.20 Wherever erection sequences are furnished by BHEL, the contractor shall follow the same sequence. If required by BHEL, the contractor shall change the sequence of his operation so that work on priority sectors can be completed within the projects schedule. The contractor shall afford maximum assistance to BHEL in this connection without causing delay to agreed completion date.

10.1.21 Any wrong erection shall be removed and re-erected promptly to comply with the design requirements to the satisfaction of Site Engineer.

10.1.22 Contractor has to work in close co-ordination with other erection agency at site. BHEL engineer will co-ordinate area clearance. In a project of such magnitude, it is possible that the area clearance may be less / more at a particular given time. Activities and erection program have to be planned in such a way that the milestones are achieved as per schedule/ plans. Contractor shall arrange & augment the resources accordingly.

10.1.23 Contractor shall remove all scrap materials periodically generated from his working area in and around power station and collect the same at one place earmarked for the same. Failure to collect the scrap is likely to lead to accidents and as such BHEL will make alternative arrangement and recover the cost incurred for the same along with 5% overheads. Decision of BHEL shall be final and binding on the contractor. All the package materials, including special transporting frames, etc. shall be returned to the BHEL stores / customer's stores by the contractor.

10.1.24 The contractor is strictly prohibited from using BHEL's regular components like angles, channels, beams, plates, pipe / tubes, and handrails etc. for any temporary supporting or scaffolding works. Contractor shall arrange himself all such materials. In case of such misuse of BHEL materials, a sum as determined by BHEL engineer will be recovered from the contractor's bill. The decision of BHEL engineer is final and binding on the contractor.

10.1.25 No member of the already erected structure / platform, pipes, grills, platform, other component and auxiliaries should be cut without specific approval of BHEL engineer.

10.1.26 For other agencies, such as piping, Boiler, ESP, instrumentation, insulation etc., to commence their work from / on the equipments coming under this scope, Contractor has to clear the front, expeditiously and promptly as instructed by BHEL Engineer. Some time it may be required to re-schedule the activities to enable other agencies to commence/ continue the work so as to keep the overall project schedule.

10.1.27 The terminal points decided by BHEL are final and binding on the contractor for deciding the scope of work and effecting the payment for the work done up to the terminals.

10.1.28 Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes.

10.1.29 On Completion of work, all the temporary buildings, structures, pipe lines, cable etc. shall be dismantled and levelled and debris shall be removed as per instruction of BHEL by the contractor at his own cost. In the event of his failure to do so, the expenditure towards clearance of the same will be recovered from the contractor. The decision of BHEL Engineer in this regard is final.

10.1.30 Prior to erection of any components inspection to be done for any foreign materials and damages and they are to be attended as per directions of BHEL engineer.

10.1.31 It is the responsibility of the contractor to do the alignment, checking, etc. if necessary, repeatedly to satisfy BHEL Engineer / Customer Engineers with all the necessary tools and tackles, manpower etc. without any extra cost. The alignment will be completed only when jointly certified so, by the BHEL Engineer & Customer. Also the contractor should ensure that the alignment is not disturbed afterwards.

10.1.32 If any item or equipment not covered but requires being erected/ commissioned, same shall be carried out by the contractor. The item rates shall be determined as per GCC.

10.1.33 The contractor shall ensure that his premises are always kept clean and tidy to the extent possible. Any untidiness noted on the part of the contractor shall be brought to the attention of the contractor's site representative who shall take immediate action to clean the surroundings to the satisfaction of the Engineer-in-Charge.

10.1.34 All the necessary certificates and statutory licenses required to carry out this scope of work are to be arranged by the contractor at his own cost. Also refer clause - ELECTRICAL INSPECTORATE'S APPROVAL- given below:

10.2 ELECTRICAL INSPECTORATE'S APPROVAL:

10.2.1 The contractor shall arrange necessary statutory inspections and obtain certificates for the installation work at his cost. Contractor is responsible for getting Electrical Inspector / statutory authority's approval for all electrical installation covered in his scope.

10.2.2 All electrical installation covered in contractor's scope is to be inspected / approved by the electrical inspector / statutory authority. For getting electrical inspector approval, contractor shall arrange the following:

a. Work Completion certificate for all the equipment covered in the contract.
b. Details of Equipments (specification)
c. Copy of Test results conducted at site for all the equipment.
d. Any other documents as required by statutory authority. Any expenditure related to documentation shall be borne by contractor.

e. Contractor shall carry out the modifications / rectifications if any as suggested by the authority at his own cost. However, it is not applicable for equipment erected by Mechanical contractor.

f. Valid Electrical Contractor's License of Chattisgarh state.

g. Valid Supervisory Competency Cerfiticate.

10.3 SITE INSPECTION

10.3.1 The owner / employer or his authorized agents may inspect various stages of work during the currency of the contract awarded to him. The contractor shall make necessary arrangements for such inspection and carry out the rectification pointed out by the owner / employer without any extra cost to the owner / employer. No cost whatsoever for such duplication of inspection of work will be entertained.

10.3.2 BHEL / Customer will have full power and authority to inspect the works at any time, either on the site or at the contractor's premises. The contractor shall arrange every facility and assistance to carry out such inspection. On no account will the contractor be allowed to proceed with work of any type unless such work has been inspected and entries are made in the site inspection register by customer / BHEL.

10.3.3 Wherever the performance of work by the contractor is not satisfactory in respect of workmanship, deployment of sufficient labour or equipment, delay in execution of work or any other matter, BHEL shall have the right to engage labour at normal ruling rates and get the work executed through other agency and debit the cost to the contractor and the contractor shall have no right to claim compensation thereof. In such a case, BHEL shall have the right to utilize the materials and tools brought by the contractors for the same work.

10.4 MANPOWER REQUIREMENT

10.4.1 The contractor shall provide to the satisfaction of BHEL, sufficient and qualified staff for the execution of works. If and whenever any of the contractor's staff is found guilty of any misconduct or be incompetent or insufficiently qualified in the performance of his duties the contractor shall remove them from site as directed by Site Engineer.

10.4.2 Supervisor should have a minimum qualification of Diploma in Engineering or any graduate with minimum 05 years of experience in Thermal Power Station.

10.4.3 The Site in charge shall be provided with PCs and good communication facilities like telephone, fax, email etc. at the cost and expense of the contractor. Lack of communication facilities will not be an excuse for extension of completion date.

10.4.4 All instructions from BHEL / Customer will be directed to the contractor through the Site In-charge and he shall be responsible for all the contractor's activities at site. The contractor shall name his authorized representative prior to or immediately on commencement of operations at site

10.4.5 The Site In-charge shall be present at site during all normal working hours and his contact address after normal working hours shall be made available to BHEL so that if any emergency arises, the presence of the contractor's site Representative at site can be called for.

10.4.6 The contractor shall not change the site Representative without the consent of BHEL. Should BHEL require the replacement of the contractor's site Representative for justifiable reasons (including inadequate progress of work) the contractor shall ensure that replacement is made as soon as possible and work is not allowed suffering delay on this account.

10.4.7 The contractor shall ensure that all his supervisor's staff and workmen conduct themselves in a proper manner. They shall all be persons who are familiar with and skilled at the jobs allocated to them. Any misconduct / inefficiency noted on the part of

the contractor's personnel shall be brought to the attention of the contractor's site representative who shall immediately take such action as necessary including the removal of such misconducting / inefficient persons, if so required by the Engineer-in-Charge.

10.5 DOCUMENTATION

10.5.1 The following information shall be furnished by the bidder after testing and inspection:
Test certificates of various tests conducted at site. All inspection and test certificates shall be signed by customer's representative also, wherever called for as per field quality plan.

10.5.2 As built drawings:
After successful completion, testing and commissioning of installation work, Purchaser's drawings / documents shall be updated in line with the actual work carried out and as built drawings / documents shall be submitted by the contractor as agreed for the project.

10.5.3 These requirements are apart from the preparation of detailed engineering drawings which are part of the scope of work.

10.6 FOUNDATIONS AND GROUTING

10.6.1 Foundation for the equipments to be erected are in the scope of the contractor.

10.6.2 Cleaning of foundation surfaces, pocket holes and anchor bolt pits etc., de-watering, making them free of oil, grease, sand and other foreign materials by soda wash, water wash, compressed air or any other approved methods etc., form/shuttering work are within the scope this work.

10.6.3 The surface of foundations shall be dressed to bring the surface of the foundations to the required level and smoothness prior to placement of equipments.

10.6.4 Foundation pockets are to be cleaned thoroughly before placing the columns/ equipment. Verticality of foundation bolts to be checked along with correctness of the threads and freeness of the nuts movement. If required, cleaning of the threads to be done with proper dies.

10.6.5 The concrete foundation, surfaces shall be properly prepared by chipping, as required to bring the top of such foundation to the required level to provide the necessary roughness for bondage and to ensure enough bearing strength. All laitance and surface film shall be removed and cleaned. The required percentage contact between contact surfaces of Packer plates and foundation shall be achieved by chipping and scrapping as per BHEL Engineer's instructions.

10.6.6 For grouting of equipment; necessary cement, sand, gravels, etc. to be arranged by the contractor including the fine aggregates.

10.6.7 The BHEL supplied items are in the process of finalization. The foundation drawings and requirements mentioned are tentative which may change based on the actual foundation drawings received and finalized with the equipment manufacturer.

10.6.8 Contractor has to carry out the grouting as per the work instructions for grouting available at site.

10.7 MATERIAL HANDLING AND SITE STORAGE

10.7.1 SCOPE OF STORAGE / TRANSPORT OF CONTRCTOR SUPPLIED ITEMS

a) Contractor shall make his own arrangement for transporting the materials to site from BHEL stores/ yards. Necessary material handling equipment for transporting to site/ stores and also for taking delivery from stores to work place shall be arranged at his cost.

b) Any excess materials supplied for which payment has not been made can be taken back by the contractor as per customer procedure. Incoming material gate pass shall be made for any material supplied by the contractor.

c) Contractor shall unload, transport, store, erect, test and commission the equipment as per instructions of the manufacturer's recommendation.

d) Contractor shall be responsible for examining all the shipment immediately for any damage, shortage, discrepancy etc. for the purpose of Purchaser's information only. However, the Contractor shall be solely responsible for any shortages or damages in transit, handling and/or in storage and erection of the equipment at Site.

10.7.2 COLLECTION OF BHEL SCOPE OF SUPPLY MATERIALS

a) Contractor shall take delivery of BHEL supplied materials from the / stores storage yard / sheds of BHEL / customer, which is within the plant premises after getting approval of engineer / customer in the prescribed indent forms of BHEL / customer. He shall also make arrangements for safe custody, watch and ward of equipment after it has been handed over to him till they are fully erected / commissioned. The contractor shall transport materials to erection site by the prescribed route without disturbing and damaging other's works in the most professional manner and the materials shall be stored in appropriate manner as per BHEL's instructions.

b) Loading at BHEL / Customer stores and storage yard, transport to site, unloading at site / working area of equipment placement on respective foundation / location, fabrication yard, pre-assembly bay or at working area are in the scope of work of the contractor. The scope includes taking materials / Equipments from customer stores / storage yard also. Contractors Quoted / Accepted rate shall be inclusive of the same. Required cranes, tractors, trailer or trucks / slings / tools and tackles / labour including operators Fuel lubricants etc. for loading & unloading of materials will be in the scope of contractor.

c) BHEL shall issue materials covered in BHEL scope from their stores at site. The contractor shall collect such materials from BHEL stores and transport to site of work at his cost.

d) The equipment / materials from the storage yard shall be moved in sequence to the actual site of erection / location at the appropriate time as per the direction of BHEL Engineer so as to avoid damage / loss of such equipment at site.

e) The contractor shall inspect such materials as soon as received by the contractor and shall bring to the attention of the Engineer-in-Charge any shortage / damage or other defects noticed before taking over the materials. Materials once taken over will be deemed to have been received in good condition and in correct quantities except for intrinsic defects which cannot be observed by visual and dimensional inspection and weighing.

f) Upon receipt by the contractor the responsibility for any loss, damage and / or misuse of such materials shall rest with the contractor.

g) All materials issued by BHEL shall be properly stored and systematic records of receipts, issue and disposal will be maintained. Periodic inventory shall be made available to BHEL Engineer-in-Charge.

h) All materials issued by BHEL shall be utilized as directed by Engineer-in-Charge or most economically in the absence of such direction. The contractor shall be responsible for the return of all surplus material to BHEL Stores, as determined by the Engineer-in-Charge.

i) If the materials issued by BHEL are lost, damaged or unaccounted, the cost of such items shall be recovered from payments to the contractor. However, the contractor shall raise FIR and inform BHEL all details.

j) Sometimes it may become necessary for the contractor to handle certain unrequired components at Customer's / BHEL's stores in order to take out the required materials. The contractor has to take this contingency also into account. No extra payment is payable for such contingencies.

10.7.3 STORAGE

a) The contractor shall provide any fixtures, concrete blocks & wooden sleepers, which are required for temporary supporting / storage of the components and equipment at site.

b) The equipment should be preferably in its original package and should not be unpacked until it is absolutely necessary for its installation. The equipment should be best protected in its cases. It should be arranged away from walls.

c) The wooden pallet provided for packing itself can be retained for raised platform to protect equipment from ground damps, sinking into around and to circulate air under the stored equipment. This will also help in lifting the packing with fork lift truck.

d) Periodic inspection of silica gel placed inside the equipment is necessary. It has to be replaced when decolonization takes place or regenerated. BHEL shall supply the material and contractor shall replace.

e) Due care should be taken to ensure that the equipment is not exposed to fumes, gases etc. which can affect electrical contacts of relays and terminal boards.

f) The storage room and the equipment should be checked at regular interval of three months to ensure protection from termites, mould growth, condensation of water etc. which can damage the equipment.

g) Contractor shall keep BHEL informed about such problem and try to rectify the problem at his own cost.

h) All the instrument, materials and goods kept in the store room should be identified and registered in a book. Inspection report should be recorded. Any discrepancy observed should be communicated to site immediately to the Engineer in Charge.

i) The loose items supplied for the main equipment falls into various categories like tools, modules, prefabricated cables, console inserts, recorders, modules and display units, printers, sensors and transducers, PCs, monitors, cable glands, cable ducts, frames etc. are to be categorized and stored separately.

10.7.4 SUB-ASSEMBLIES

a) All sub-assemblies should be kept in a separate place where they are easily accessible.

b) Sub-assemblies should have a protective cover in case it is stored without wooden packing / case to prevent accumulation of dust. Silica gel packets should also be kept along with it.

c) Sub-assemblies should not be stacked one above the other.

d) Materials shall be stacked neatly, preserved and stored in the contractor's shed / work area in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work area / site to enable other agencies to carry out their work, same shall be done by the contractor at no extra cost.

10.8 SCOPE OF ROUTE SURVEY LAYOUT AND DETAILED DRAWINGS

The drawings provided along with the tender are only schematic, typical and tentative. The contractor shall prepare final detailed drawings in consultation with site engineers after carrying out the route survey for distribution. These drawings shall be prepared in accordance with IE-Rules and have to be approved by the electrical statutory authorities. Obtaining approval from statutory authority shall be the responsibility of the contrctor and any expenditure involved in getting approval from statutory authority

for the drawings and documents generated by the contractor shall be borne by the contractor. Based on the detailed drawings, contractor shall arrive at the final quantities of items which are to be procured/ fabricated, installed for construction power equipments as required and erected as per drawings. After CEA INSPECTOR VISIT, if any modification/ correction is required in line with applicable IE standards the same has to be completed by the vendor WITHIN THE QUOTED RATES. However, the material as required will be provided by BHEL with the approval of site incharge.

10.9 SCOPE OF SUPPLY

a) Scope of supply of materials shall be as detailed in the BOQ. All materials shall be procured from reputed manufacturers as per IS specification. Bidder shall ensure technical compliance for supply and erection to ensure trouble-free operation. Necessary test certificates, guarantee certificate etc. shall be submitted to BHEL along with supply.

b) The quantities furnished in the BOQ for supply items are approximate only. Contractor shall assess the quantity of supply items after conducting route survey and detailed engineering, which is part of this contract and also taking in to consideration the materials supplied by BHEL.

c) If suitable materials are available with BHEL, the quantity of supply items shall be reduced accordingly. The payment for erection of BHEL supply items shall be as per rate quoted for erection.

d) The quantity to be supplied shall be strictly as per site requirement only in consultation with Engineer-in-Charge. Before starting erection, the contractor shall get all the supply items in his scope verified by BHEL and also get necessary endorsement from BHEL Stores. BHEL's endorsement or Store Receipt Voucher (SRV) shall be submitted along with bills for payment of Supply items. After BHEL verification, material shall be kept under contractor's custody.

10.10 SCOPE OF ERECTION

a) The scope of this Construction Power Package work includes detailed engineering, supply, identification of equipment at BHEL storage yard, technical assistance for checking and making the shortage / damage reports, taking delivery at storage yard, transportation to site, handling of material at site, erecting, and carrying out statutory tests as required, commissioning and maintenance of the equipments erected till contract period using their tools and tackles and testing instruments along with the supply of all consumables.

b) The scope of specification covers the installation, testing and commissioning of the equipment / instrument along with accessories as detailed in Bill of Quantity. The detailed engineering is in the scope of the vendor which may result in minor changes to the items and quantities.

c) Site testing shall be carried out for all electrical equipment installed by the contractor to ensure proper installation and functioning in accordance with drawings specifications and manufacturer's recommendations.

d) All the work shall be carried out as per instructions of BHEL engineer. BHEL engineer's decision regarding the correctness of the work and method of working shall be final and binding on the contractor.

10.11 SCOPE OF SUB STATION YARD LEVELING AND FENCING

a) After conducting route survey and identifying substation location, the yard shall be levelled suitably. Necessary, PCC pavement, fencing, construction of foundation for

Transformer, RMU, VCB, PSS, LTDB, etc. plinth wall, etc. shall be carried out by the contractor. The supply of materials required for the above civil works shall be arranged by the contractor.

b) 2) No separate unit rate shall be paid for the substation yard leveling and fencing which shall be part of respective 11/11.5kV substation or 11 kV/433V substation works.

10.12 SCOPE OF ERECTION OF 2.5 MVA – ONAN TRANSFORMER

a) 2.5 MVA, 11/11.5 kV ONAN transformers will be supplied by BHEL and the same shall be drawn from BHEL –stores or yard and transported to the required location. The contractor shall make his own arrangements for loading the transformers from BHEL-Stores and unloading the same at the specified location. T& P and other materials required for loading and unloading the transformers shall be arranged by the contractor.

b) Transformer shall be checked up thoroughly and if any items are found to be damaged and requires replacement, the same shall be carried out by the contractor at free of cost. However, replacement materials shall be arranged by BHEL including Transformer oil.

c) All BHEL transformers will be supplied in oil filled / without oil filled and assembled conditions. Filling of oil and filtration shall be carried out by the contractor for all the transformers supplied by BHEL.

d) All testing instrument such as megger, multi-meter, oil test kit, oil-filtering machine, H.V test kit, etc. shall be arranged by the contractor to carry out the checking of the transformer. Oil filtration shall be carried out by the contractor till achieving the Dielectric strength as stipulated, other tests like insulation resistance and earth resistance checks, and Dielectric strength test of oil before filling, Buchholz relay test and phase sequence test shall be carried out by the contractor. After completing all the works, touch up painting shall be carried out for all the transformers.

e) No separate unit rate shall be paid for the erection of Transformers which shall be part of 11/11.5 kV substation works.

10.13 SCOPE OF 11 kV RING MAIN SYSTEM (FEEDER POWER DISTRIBUTION SYSTEM)

a) BHEL Scope of supply as free issue:

i. HT Cables of required Qty
ii. ACSR DOG Conductor.

b) Contractor scope of work for 11 kV Ring Main Distribution System includes:

i. Conducting route survey
ii. Preparation of distribution drawings
iii. Vetting of drawings & documents by BHEL
iv. Installation of BHEL supplied free issued materials as mentioned under above clause.
v. Supply and installation of poles, accessories and O/H line forming ring main system.
vi. PSCC poles / RS joist poles/ 11 kV GI stay set: The scope of erection work shall include excavation of earth, as per drawing, grouting with concrete of M20/M25, supply of cement, sand, metal etc. to withstand wind velocity and coping of poles etc. complete.
vii. Supply and installation of HT Termination and joining kits, Glands, lugs, etc. Separate item rates are provided for laying of HT and LT cables, supply and installation of HT termination kits, stringing of ACSR DOG conductor.
viii. Excavation and refilling of earth
ix. Supply and installation cable route markers. (Separate item rates are provided.)

10.14 SCOPE OF PACKAGE SUBSTATION (PSS)

a) PSS will be supplied by BHEL and the same shall be drawn from BHEL stores and transported to the required location. The contractor shall make his own arrangements for loading the PSS from BHEL- Stores and unloading the same at the specified location. The contractor shall arrange necessary T&P and other materials required for loading and unloading. Necessary civil foundation including supply of materials shall be arranged by the contractor before erecting the PSS.

b) If any loose items supplied along with PSS that are required to be mounted, the same shall be carried out by the contractor at free of charge.

c) The base framed shall normally be supplied along with the PSS. These shall be aligned, levelled and grouted in position, as per approved drawings. Wherever the base channels are not available, the same shall be fabricated and painted and the same shall be carried out by the contractor at free of cost. However, required materials shall be arranged by BHEL with the approval of Site In-charge/BHEL. Base channels shall be grouted on the foundation.

d) PSS shall be checked thoroughly before charging. After the satisfactory completion of these checks, the LT Board and 11 kV VCB shall be energized. The contractor shall arrange all instruments required for testing at his cost.

e) The Package substations shall be assessed and checked up thoroughly and if any items are found to be damaged/defective/ not working and requires replacement or any internal wiring to be modified, the same shall be carried out by the contractor at free of cost. However, replacement materials shall be arranged by BHEL.

f) No separate unit rate shall be paid for the erection of PSS which shall be part of shall be part 11kV/433V substation works.

10.15 SCOPE OF LAYING AND TERMINATION OF H.T. AND L.T. CABLE

a) BHEL shall supply the LT and HT cables as free issue.

b) All cables shall be drawn by the contractor from BHEL Stores.

c) The cables thus drawn shall be cut to size as per route length and laid.

d) The cables drawn from the BHEL stores shall be meggered before laying and any defect observed after laying also, the contractor shall replace / rectify the same free of charges.

e) Unit rate quoted for LT cables are on per meter basis and shall cover laying, termination, excavation of earth for a depth of approx. 1000mm refilling of excavated earth & compaction.

f) Unit rate quoted for HT cables are on per meter basis and shall cover laying, excavation of earth for a depth of approx. 1000mm refilling of excavated earth & compaction.

g) H.T Cable termination shall be carried out only by the HT cable jointer with utmost care.

h) Cable laying and termination shall be in accordance with IS specification as listed as a part of this document. The cables shall be suitably supported so that the cable load should not cause strain to the equipment connected.

i) If suitable cable box is not supplied along with the equipment i.e. the transformer, Suitable cable adaptor boxes shall be arranged by the contractor at free of cost and cable termination shall be carried out by using suitable cable glands etc as required.

j) Suitable pillar box shall be installed to form ring main systems at the incomer side.

k) HT Cables shall be laid in below ground at a depth of 1000 mm. Before stating excavation, route survey shall be conducted in consultation with site engineers. Cable shall be laid through GI pipes / Hume pipes as protective cover wherever road crossings

are there. Excavation, laying of pipes and refilling of earth etc. are included in the respective item rates.

l) Both supplying and laying of GI pipes & Hume pipes are in the scope of contractor with separate item rates.

m) Supply of LT cable glands, lugs, etc., are part of the respective cable laying.

n) No separate payment shall be made for jointing of LT Cables as they are already included in the laying of respective LT Cable sizes.

o) The cables to be laid on the cable trays (600mm) mentioned in the BOQ and the trench of the 11/11.5kV substation shall utilize the same item rate as underground cables.

p) Transportation and storage of cable drums shall generally conform to the requirements of IS: 1255.

10.16 SCOPE OF ERECTION OF L.T. KIOSK (LT DISTRIBUTION BOARD, LIGHITING DISTRIBUTION BOARD)

a) LT Kiosk will be supplied by the contractor as per the BOQ or BHEL, which may be diverted from other sites and the same shall be drawn from BHEL stores and transported to the required location. The contractor shall make his own arrangements for loading the L.T Kiosk from BHEL- Stores and unloading the same at the specified location. The contractor shall arrange necessary T&P and other materials required for loading and unloading.

b) LT Kisok shall be totally enclosed dust and vermin proof cubicles without louvers and suitable for outdoor application and wall/ column/ structure mounting type with sloping canopy confirming to IP 55 class

c) LT Kiosk shall be constructed from CRCA sheet. The sheet steel used shall be cold rolled and two mm thick. The construction of LT Kiosk shall ensure adequate rigidity. All components of the LT Kiosk shall be fully mounted inside the panel. LT Kiosk shall have only one operational Front. Door shall be provided to give full access to all the components. Door shall have padlocking arrangement.

d) Good quality synthetic rubber/ neoprene gaskets shall be fixed around the door. The door when closed, shall compress the gasket uniformly.

e) LT Kiosk shall be designed to prevent contact with live parts when the front door is open.

f) LT Kiosk shall be fitted with MS mounting brackets and adequate size of removable undrilled gland plate of three mm thickness.

g) LT Kiosk shall be fitted with two GI earth studs located in accessible position on the outside of the panel on opposite sides.

h) All metal parts of the panel except current carrying parts shall be bonded together electrically to the earthing stud. Phase barriers of fireproof insulating material shall be fitted in such a manner that it is not readily possible for personnel to touch the phase bus-bars.

i) The incomers and outgoings of the LT Kiosk are mentioned in the respective item of the BOQ. LT Kiosk shall be provided with earth stud, earth bus bar etc. designated with labels. Applicable standards are IS: 2675, IS: 4237, IS: 13947

j) 9. The location for erection shall be decided at site, in consultation with BHEL Engineer. Any mounting arrangement like construction of foundation, fabrication and fixing of mounting supports including supply of materials like cement, sand, steel, metal etc. shall be arranged by the vendor at his cost. Fabrication materials like angle and channels will be supplied by BHEL. The scope of erection of LT Kiosk includes providing two numbers of Earth pits per LT Kiosk for which separate item rates are provided.

k) If any loose items supplied along with L.T Kiosks are required to be mounted, the same shall be carried out by the contractor at free of charge.

l) Kiosk shall be checked up thoroughly and if any items are found to be damaged/ defective/ not working and requires replacement or any internal wiring to be modified, the same shall be carried out by the contractor at free of cost. However, replacement materials shall be arranged by BHEL.

m) Erection of LT Kiosks shall cover all the works mentioned above including touch up painting. The base frames shall normally be supplied along with the kiosks. These shall be aligned, levelled and grouted in position, as per approved drawings. Wherever the base channels are not available, the same shall be fabricated and painted by the contractor within the quoted rates. However, required steel materials shall be arranged by BHEL with the approval of Site In-charge/BHEL. Base channels shall be grouted on the foundation.

n) LT Kiosk shall be checked thoroughly and before charging. Contractor shall carry out checking of Breaker operation, Fuse unit operation, Bus bar clearances, earth resistance and protection checks etc. After the satisfactory completion of these checks, the LT Kiosk shall be energized. The contractor shall arrange all instruments required for testing at his cost.

10.17 SCOPE OF SUPPLY AND INSTALLATION OF SIGN BOARDS AND SAFETY MEASURES

a) All required signboards, caution boards and safety boards shall be arranged and installed by the contractor in all poles and substations wherever required. Feeder description and line description shall be displayed at vital locations. Foremost importance shall be given to Safety, and the contractor shall adhere to safety instructions and ensure use of safety appliances, as required. The contractor shall provide all safety equipments to his workmen to avoid accidents.

b) No separate unit rate shall be paid for the supply and erection of sign board which are to be laid with in the substation and that shall be part 11 kV/ 433 V substation works or 11kV/11.5kV substation works as per BOQ.

10.18 SCOPE OF EARTHING AND LIGHTNING PROTECTION SYSTEM

a) The scope of earthing covers earthing of all substation equipments, and providing earth pits as per IS requirement.

b) The scope of earth pits covers excavation, supply and erection of 3m long earth electrode, filling the pits with alternate layer of charcoal & salt as per IE specification, making of brick chamber with both side plastering supply and fixing of manhole cover plate with RCC slab, as per typical drawing provided by BHEL.

c) Number of earth pits for substation shall be decided considering soil resistively. However, PSS substation shall have 6 Nos pits. i.e. 2 Nos for neutral, 2 No for Body and 2 Nos for LA and 11/11.5kV substation shall have minimum 10 earth pits for earth Mat & Body earthing, 4 nos. for Neutral earthing and 04 nos. for LA earthing.

d) LIGHTNING: The scope of work of Lightning Protection system includes supply and installation of two numbers vertical air terminations and poles of 06m long with base plate. The pole shall be tubular stepped type as per applicable standard. Vertical air terminal shall be grounded with earth pits. Required civil works for lightning pole erection and grouting, grounding the air terminals and supply of grouting and grounding materials are in the scope of Contractor. The supply of above base plate is in the scope of contractors.

10.19 DETAILED SCOPE OF WORKS – YARD LIGHTING:

10.19.1 SWAGED LIGHTING POLES:

e) Lighting poles for flood lights shall be of steel tubular swaged type 09-metre-long steel poles as per applicable standard. The steel poles shall be coated with bituminous preservative paint on the inside as well as outside surface. Exposed outside surface of steel poles shall be painted with one coat of red lead oxide primer. After installation, two coats of Aluminium paint shall be applied

f) The poles shall be supplied with associated pole mounted Junction Boxes, suitable MS base with shop drilled holes or by suitable clamps for fixing of light fixtures. No cutting or drilling of galvanized structure is permitted.

g) The lighting poles shall be erected at the locations shown in the layout drawing (This drawing is in the scope of bidder). The scope of erection work shall include excavation of earth, as per drawing, grouting with concrete M20/ M25, supply of cement, sand, metal etc. to withstand wind velocity, mounting of assembled fittings, wiring/ cabling from junction box at the bottom of pole up to the lighting fixture, installation of 50mm dia of medium thickness GI pipe for cable protection from trench to junction box for loop-in-loop-out cable. All the above required materials shall be supplied by the bidder under the respective item rates as mentioned in the BOQ.

h) Unit rate quoted for Erection of lighting pole includes Earthing of lighting pole Junction boxes and lighting fixtures, in compliance with IE rules and applicable Indian Standard. Each lighting pole JB shall be earthed by 25x3mm GI Flat bonded to 25 mm dia GI earth electrode of 3-meter length driven vertically in the ground. 14SWG GI wire shall be taken from fixture to JB including fixing of clamps.

10.19.2 LIGHTING FIXTURES

a) The luminaries shall be street light LED fittings of 90W.

b) Street light luminaires shall be of weather proof for outdoor application.

c) Luminaires shall be of continuous trouble free operation under atmospheric conditions, without reduction in lamp life or without deterioration of materials and internal wiring. Fixtures shall be provided with outdoor type weather proof box with IP-54 or better. Applicable standards are IS: 1913, IS: 1777, IS: 4012, IS: 4013.

10.20 PROGRESS OF WORK

a) BHEL uses SDD (Site Data Digitization), IPMS (Integrated Project Management System) etc. for work progress and the same shall be utilized for planning and review. Necessary help and coordination shall be given by the vendor for the same.

b) The progress reports shall indicate the progress achieved against plan, indicating reasons for delays, if any. The report shall also give remedial actions which the contractor intends to make good the slippage or lost time so that further works can proceed as per the original plan and the slippages do not accumulate and affect the overall programme.

c) It is the responsibility of the contractor to provide all relevant information on a regular basis regarding erection progress, labour availability, equipment deployment, testing, etc.

d) Contractor is required to draw mutually agreed monthly erection programs in consultation with BHEL well in advance. Contractor shall ensure achievement of agreed program and shall also timely arrange additional resources considered necessary at no extra cost to BHEL.

e) Progress review meetings will be held at site during which actual progress during the week vis-a-vis scheduled program shall be discussed for actions to be taken for

achieving targets. Contractor shall also present the program for subsequent week. The contractor shall constantly update / revise his work program to meet the overall requirement. All quality problems shall also be discussed during the above review meetings. Necessary preventive and corrective action shall be discussed and decided upon in such review meetings and shall be implemented by the contractor in a time bound manner so as to eliminate the cause of nonconformities.

f) The contractor shall submit daily, weekly and monthly progress reports, manpower reports, materials reports, consumables (gases / electrodes / ferrules / lugs) report, cranes availability report and other reports as per Performa considered necessary by the Engineer as per the BHEL formats.

g) The contractor shall submit weekly / fortnightly / monthly statement report regarding consumption of all consumables for cost analysis purposes.

h) The manpower reports shall clearly indicate the manpower deployed, category wise specifying also the activities in which they are engaged.

i) The monthly report shall be submitted at the end of every month as a booklet and shall contain the following details: -

i. Colour Progress photographs of executed jobs etc.

ii. Erection progress in terms of tonnage, percentage of work completion, welding joints, radiography, stress relieving, etc. completed as relevant to the respective work areas against planned.

iii. Site Organization chart of engineers & supervisors as on the last day of the month with further mobilization plan.

iv. Category-wise man hours engaged during the previous month under the categories of fitters, welders, riggers, khalasis, grinder-men, gas-cutters, electricians, crane operations, store keepers, lab technician's helpers, security etc. Data shall be split up under the work areas like Boiler (pressure parts, structures) Rotating machines, Electrostatic precipitator, Insulation, Piping, Steam turbine, Condenser, Generator etc.

v. Consumables report giving consumption of all types of gases and electrodes during the previous month.

vi. Availability report of cranes

vii. Safety implementation report in the format

viii. Pending material and any other inputs required from BHEL for activities planned during the subsequent month.

j) The contractor to reflect actual progress achieved during the month and will be submitted to BHEL, so that slippages can be observed and necessary action taken in order to ensure that the situation does not get out of control and will update the construction schedule forming part of this contract each month.

10.21 TESTING AND COMMISSIONING WORKS:

a) The contractor shall take the full responsibility of testing and commissioning of the equipment being installed by him under the overall supervision of BHEL. It shall be the responsibility of the contractor to arrange and complete all the testing, pre-commissioning and commissioning activities for the particular equipment as per relevant standard, code of practice, manufacturer's instructions and BHEL norms. All these will be witnessed by BHEL Engineers and reports signed jointly.

b) All T&P / instruments required for testing are to be arranged by the contractor. Any special equipment, tools and tackles, IMTEs etc. required for the successful completion of the Commissioning Tests shall be provided by the Contractor, free of cost.

c) All testing activities shall be carried out as per relevant standard, code of practice, manufacturer's instructions and BHEL norms. The contractor shall submit a checklist to

BHEL prior to taking up testing and commissioning activities and the activities shall be carried out in accordance with the checklist approved by BHEL. All the above will be witnessed by BHEL engineer and the reports signed jointly.

d) The commissioning activities, tests, trial runs may have to be repeated till satisfactory results are obtained and also to satisfy the requirements of BHEL / customer / consultant / statutory authorities like boiler inspector, electrical inspector etc.

e) Prior to commissioning and after commissioning, protocols have to be made with BHEL / Customer. The formats will be given by BHEL and have to be printed by the contractor in adequate numbers.

f) It shall be the responsibility of the contractor to commission and attend any problem in the equipment erected by the contractor using various categories of workers in sufficient numbers along with Supervisors. Association of BHEL's / Client's staff during above period will not absolve contractor from above responsibilities. The commissioning group shall have the knowledge of various systems referred in the tender and possess adequate experience in testing and commissioning.

g) All the tests at various stages shall be repeated till all the equipment satisfy the requirement of BHEL / Customer. Any rectifications required shall have to be done / redone by the contractor at his cost.

h) The contractor shall carryout any other test not listed in the tender but as desired by BHEL Engineer on erected equipment covered under the scope of this contract during testing, pre-commissioning, commissioning, and operation, to demonstrate the completion of any part or whole work performed by the contractor.

i) In case, any rework is required because of contractor's faulty erection, which is noticed during pre-commissioning and commissioning, the same has to be rectified by the contractor at his cost. If any equipment / part is required to be inspected during pre-commissioning and commissioning, the contractor will dismantle / open up the equipment / part and reassemble / redo the work without any extra claim.

j) During commissioning any improvement / repair / rework / rectification / fabrication / modification due to design improvement / requirement is involved, the same shall be carried out by the contractor promptly and expeditiously.

10.22 FINAL PAINTING

k) The quoted rate / price shall be inclusive of supply and application of final painting of all the erected equipments like all steel items such as supports, racks, frames, HT/LT KIOSK, Transformers, etc as per the painting specifications of customer / BHEL.

l) In the case of steel fabricated items, raw steel after fabrication has to be cleaned and subsequent painting to be carried out.

m) All the exposed metal parts of the equipments including busducts, transformers, structures, etc., wherever applicable after installation unless otherwise specified the surface protected, are to be first painted with at least one coat of suitable primer and required number of finish coats as specified by BHEL which matches the shop primer paint used after thoroughly cleaning the dust, rust, scales, grease oil, and other foreign materials by wire brushing scrapping and chemical cleaning and the same being inspected and approved by BHEL engineers for painting. Afterwards the above parts shall be finished with as per the instructions of BHEL / Customer official.

n) Normally Paint shall be applied by brushing as per the instruction of BHEL Engineer. It shall be ensured that brush marks are minimum. If needed and insisted either by BHEL / Customer in certain cases, spray painting has to be carried out within the Quoted rates. Spray painting gun and compressed air arrangement has to be made by the contractor himself within the Quoted rates.

o) All damaged galvanized surfaces including cable trays shall be coated with cold galvanizing paint.

p) Paint used shall be stirred frequently to keep the pigment in suspension. Paint shall be of the ready mix type in original sealed containers as packed by the paint manufacturer. No thinners shall be permitted. Paint manufacturer's instructions shall be followed in method of application, handling, drying time etc.,

q) The scope of painting includes application of colour bands, lettering the names of the systems, equipments, danger / warning signs and other data as required by BHEL within the quoted rate.

r) All surfaces shall be thoroughly cleaned, free from scales, dirt and other foreign matter. Each coat shall be applied in an even & uniform film free from lumps, streaks, runs, sags and uncoated spots.

s) The actual colour to be applied shall be approved by the customer / BHEL before starting of actual painting work.

t) Primer & finish paint shall be of reputed paint supplier approved by BHEL / Customer. Contractor has to procure paints from the BHEL / Customer approved agencies only. The quality of the finish paint shall be as per the standards of IS or equivalent as approved by BHEL / Customer. Before procurement of paint the contractor has to obtain the clearance from BHEL authorities.

u) No paint shall be applied when the surface temp is above 55 ˚C or below 10˚C, and when the humidity is greater than 90% to cause condensation on the surface or frost / foggy weather.

v) Before commencement of final painting, contractor has to obtain written clearance from BHEL / Customer for effective completion of surface preparation.

10.23 PRESERVATION / TOUCH UP PAINTING

a) Supply & application of primer & finish paints with all manpower, tools & plants and consumables is covered in the scope of this tender.

b) Contractor shall carryout cleaning and preservation / touches up painting for the materials / equipments under this tender specification right from pre- assembly stage till the equipment is cleared for final painting within the quoted rate.

c) Any equipment which has been given the shop coat of primer shall be carefully examined after its erection in the field and shall be treated with touch up coat of red oxide primer wherever the shop coat has been abraded, removed or damaged during transit / erection, or defaced during welding.

d) Mostly the equipment / items / components will be supplied with one coat of primer paint and one coat of finish paint. However, during storage and handling, the same may get peeled off / deteriorate. All such surfaces are to be thoroughly cleaned and to be touch up painted with suitable approved primer and finish paint matching with shop paint / approved final colour.

10.24 SCOPE OF OPERATION AND MAINTENANCE

a) The scope of O & M work includes identification of items at stores / yards, checking, reporting the damages if any, taking delivery at storage yard / stores, loading, transportation to working yard, pre-assembly, calibration, checking, replacing, testing and commissioning, & post-commissioning activities using vendor's own tools and tackles and testing instruments along with the supply of all consumables like insulation tapes, HT tapes, electrodes, gas, paints, cable dressing materials, tag plates, PVC sleeves etc.

b) Operation & maintenance of High Masts, Electrical works in BHEL Offices, BHEL Stores, BHEL yards, etc. inside the Main Plant boundary erected and commissioned by other agencies will be part of this package. The Electrical works of storage areas outside the main plant boundary (if any) erected and commissioning by other agencies shall also be covered under this O&M package.

c) The contractor shall operate and maintain all the electrical installation by deploying electricians, helpers, supervisor etc. on a three shift basis as per the instruction of Engineer in charge.

d) Contractor shall attend the break down and replace the defective components promptly.

e) During the maintenance period, if the contractor fails to deploy adequate manpower continuously for two weeks, BHEL will make alternative arrangement and recover the cost incurred for the same along with 5% overheads. Decision of BHEL shall be final and binding on the contractor.

f) All the tools and plants required for preventive maintenance and breakdown maintenance shall be arranged by the contractor.

g) During the maintenance period, Contractor shall also replace any defective items from spares at free of cost for all electrical installation. However, replacement materials / spares shall be supplied by BHEL as free issue.

h) The man power should be available throughout the year inclusive of all holidays and Sundays.

i) The supply of faulty parts and spares are excluded from the contractor's scope and will be provided by BHEL free of cost.

10.25 TECHNICAL REQUIREMENT FOR ITEMS SUPPLIED BY THE CONTRACTOR.

10.25.1 GENERAL

a) Equipment and material supplied shall comply with description, rating, type and size as detailed in this specification, drawings and annexures.

b) Equipment and materials furnished shall be complete and operative in add details.

c) All the accessories, fittings, supports, anchor bolts etc., which form part of the equipment or which are necessary for safe and satisfactory installation and operation of the equipment shall be furnished.

d) All parts shall be made accurately to standard gauges so as to facilitate replacement and repair. All corresponding parts of similar equipment shall be interchangeable.

e) Samples of all items shall be made available for purchaser's approval prior to supply of item to site.

10.25.2 FERRULES

a) Ferrules shall be required for individual core of cable hence they shall be suitable for the insulated conductor diameter.

b) Ferrules shall be of plastic material.

c) Numbering on the ferrules shall be engraved type with contrast colour to the base. Engrave colouring shall be of durable quality to match the entire life of the plant. Engraving shall be legible from a distance of 600 mm.

d) Ferrules shall be interlocking type in such a way that the interlocked ferrules take the shape of tube with complete ferrule number appearing in a straight line.

10.25.3 TAGS

a) Cables tags shall be provided with cable number for identification.

b) Cable tags shall be of durable fibre, aluminium or stainless steel sheets.

c) Cable number shall be engraved type in case of aluminium or stainless steel tags, and printed type in case of fibre sheet.

d) Tags shall be durable quality of size 60mm x 12mm with holes at both ends.

e) Samples of tags shall be approved by BHEL Engineer before delivery.

f) Tags shall be provided with non-corrosive wire of sufficient strength for taggings.

10.25.4 FIRE STOP CABLE SEALING SYSTEM (AS APPLICABLE)

Fire stop cable sealing system shall have two (2) hours fire protection rating suitable for sealing both vertical & horizontal cable penetrations. The sealing compound in conjunction with mineral wool shall form effective fire seals. The sealing compound shall have special property to allow for short circuit conditions. GPG fire stop sealing compo or equivalent sealing compound shall be used.

10.26 GUIDELINES FOR ERECTION OF GI PIPES, SUPPORTS & ACCESSORIES

a) For installation of cables in GI conduits the conduits shall be installed first without cables but having suitable pull wires laid in conduits.

b) For equipment and devices having GI conduit entry arrangement other than standard GI conduit adopter, adopters shall be provided as required to enable the GI conduit to be properly terminated, between conduit end and motor T.B.

c) GI conduits shall run without moisture or water traps and shall be made drawing arrangement towards the end.

d) The entire GI conduit system shall be firmly fastened in position. All boxes and fittings shall generally be secured independently from the GI pipes entering them.

e) Bends of GI pipes/conduits shall be made without causing damage to the pipes/conduits.

f) Occupancy of conduits shall not be greater than 40%.

g) The adopter for coupling rigid GI pipe/conduits and flexible conduit shall be of aluminium or galvanised steel.

10.27 INSTALLATION, TESTING & COMMISSIONING IN GENERAL:

a) The stages of completion of various works shall be as follows:

b) Completion: Equipment shall be considered to be completely erected when the following activities have been completed.

- Moving of all equipment to the respective foundations.
- Fixing of anchor bolts or tack welding as required.
- Leveling and alignment of equipment.
- Assembling of all accessories such as relays, CTs, PTs, meters, instruments etc. as described in the job specification.
- Cable laying, termination with continuity check.
- Applying of finishing coat of paint.

c) All the equipment shall be tested at site to know their condition and to prove suitability for required performance. The site tests and acceptance tests to be performed by contractor are detailed below.

d) The contractor shall be responsible for satisfactorily working of complete integrated system and guaranteed performance.

10.28 SITE TESTS AND CHECKS

10.28.1 **General**

a) All the equipment shall be tested at site to know their condition and to prove suitability for required performance.

b) The test indicated in following pages shall be conducted after installation. All tools, accessories and required instruments shall have to be arranged by contractor. Any other test which is considered necessary by the manufacturer of the equipment, contractor or mentioned in commissioning manual has to be conducted at site.

c) In addition to tests on individual equipment some tests / checks are to be conducted / observed from overall system point of view. Such checks are highlighted under miscellaneous tests but these shall not be limited to as indicated and shall be finalized with consultation of client before charging of the system.

d) The contractor shall be responsible for satisfactory working of complete integrated system and guaranteed performance.

e) All checks and tests shall be conducted in the presence of client's representative and test results shall be submitted in six copies to client and one copy to Electrical Inspector. Test results shall be filled in proper proforma.

f) After clearance from Electrical Inspector system/equipment shall be charged in step by step method.

g) Based on the test results clear cut observation shall be indicated by testing engineer with regard to suitability for charging of the equipment or reasons for not charging and this information is to be brought to the notice of the BHEL Engineer by the contractor.

10.28.2 **Trial Run Test**

After the successful test of each equipment as per standard test procedure, the entire control system shall be put on trial run test on actual site conditions and operation of the system.

10.28.3 **Acceptance Test**

The acceptance test on the system shall be carried out by the supplier as per mutually agreed test procedures to establish satisfactorily functioning of the system as a whole and each equipment as part of the system.

10.29 TRANSFORMER

10.29.1 **INSPECTION**

a) In connection with receiving and unloading at site, and at the final storing place before assembling, the transformers shall be inspected carefully. External visible damages as dents, paint damage etc. may imply that the transformer has been subjected to careless handling during transport and/or re-loading, and a careful investigation is therefore justified.

b) After the arrival of the material at receiving points, before unloading, the condition of packing and of the visible parts should be checked and possible traces of leaks verified (condenser bushing). If necessary, appropriate statements and claims should be made.

c) Drums containing oil which have been separately dispatched should be examined carefully for leaks or any sign of tampering. All dispatched drums are filled up to their capacity and any shortage should be reported.

d) Check immediately the gas pressure at the arrival. A positive indicates that the tank and the transformer components respectively are tight, and that the active part including the insulation materials is dry.

e) If there is no positive gas-pressure, transformer should be immediately filled with dry Nitrogen gas to a pressure of 0.17 kg/cm2 (2.5 psi) without loss of time.

f) Otherwise, it should be checked if the core isolation is satisfactory and that accessories packed separately have not been damaged during transportation.

10.29.2 **UNLOADING**

a) Whenever rollers/trolleys are supplied with transformer, movement of transformer at site is carried out by mounting these rollers / trolleys.

b) Alternatively, for movement of transformer from loading bay to actual site of the equipment, skidding on greased rails etc can also be resorted to.

10.29.3 **STORING**

a) Dismantled equipment and components are packed to the protected against normal handling and transport stresses. The instructions for lifting given on the packages must be complied with to avoid damages.

b) Goods stored outdoors must not be placed directly on the ground, and should be covered carefully with tarpaulin or similar materials.

c) Oil drum should be stored in horizontal (lying) position with both the bungs also in horizontal position.

10.29.4 **CHECK POINTS BEFORE STARTING AND DURING ERECTION**

a) Check points before starting erection.

i. Conditions of leads
ii. Bracing, clamping of leads
iii. Connections
iv. Tap changer checks
v. General conditions of insulation
vi. Core check that it has not moved in transit.
vii. Core-ground; this is checked with the megger after removing earth connection
viii. CTs, including the secondary leads and their passage through metal parts
ix. Check that shipping frame for bushings have been removed.
x. Check that coil position has not moved in transit
xi. Check for dirt, metal swarf, moisture
xii. Check that the bushing leads set without being too close to ground or other points of different potential.

10.29.5 **CHECK-POINTS DURING ERECTION:**

i. By means of the part list and the transformer/reactor OGA, the assembling of a fully completed transformer is carried out according to the following instructions. The following precautions are to be taken:
ii. Fire-fighting equipment shall be available at the oil-treatment equipment as well as at work on and adjacent to the transformer.
iii. Welding work on or adjacent to the transformer shall be avoided, but if this is not possible, the work shall be supervised by fire-protection personnel.
iv. Smoking on or near the transformer shall not be allowed.
v. Transformer tank, control cabinet etc, as well as assembling and oil-treatment equipment shall be connected with the permanent earthing system of the station
vi. Check that there is no overpressure in the transformer when blanking plates or connection lids are to be opened.
vii. All loose objects, tools, screws, nuts etc. shall be removed from the transformer cover before opening the connection and blanking lids.
viii. All loose objects (tools, pencils, spectacles etc.) shall be removed from the boiler- suit pockets etc. before starting the work through man-holes.
ix. Tools to be used inside the transformer e.g. for tightening of screws-joint-shall be fastened to the wrist or another fixed point by means of cotton tape or string.
x. Tools with loose sleeves and tools with catches must not be used at work inside the transformer.
xi. Greatest possible cleanliness shall be observed at work inside the transformer, and at handling of part to be mounted inside the transformer.
xii. Fibrous cleaning materials should not be used as it can deteriorate oil when mixed with

it.

xiii. All components despatched separately should be cleaned inside and outside before being fitted.

xiv. A Transformer is best protected for damp hazard by circulating warm, dry, de-aerated oil through it until it temperature is 5˚C to 10˚C above ambient. This should be done before allowing external excess to the interior of the tank. The warm oil should be circulated all the time transformer is open to atmosphere.

xv. Oil pump & all joints in the oil pipe work should be air tight to avoid entrance of air through leakage joints.

xvi. The active part (core and winding) should be exposed to the surrounding air for as short a time as possible. Therefore, only one blanking plate or connection lid at a time should be opened for remounting of bushing, valves etc.

xvii. Objects which-despite all precaution is dropped inside transformer / reactor, must absolutely be brought up from the equipment.

xviii. Check that the oxygen content inside the transformer tank is minimum 20% if a person is to enter the tank.

10.29.6 **ASSEMBLY**

Assembly of wheels Bushing Valves, cooling device, Oil conservator, Pilol Flanges, Blanking plates and accessories like cooling fans, pumps, OLTC and components for supervision and control oil level indicator, flow indicators, gauges, Buchholz relay, PRV, thermometers etc. are assembled according to leaflet / description valid for the components.

10.29.7 **OIL FILLING**

The following procedure is recommended.

i. Close and blank the valve to isolate the conservator from main tank. Fill the oil in transformer under vacuum up to Buchholz level as per instructions given elsewhere.

ii. After filling the oil in transformer and breaking the vacuum, oil can be filled in the conservator either through reactor or by drain valve.

iii. Remove the inspection cover provided on the side of the conservator and check the air cell assuring that it is inflated. The air must remain in fully inflated condition during oil filling operation. If the air cell is found deflated, fit the inspection cover and inflate the air cell with dryair / nitrogen gas to 0.035 kg/sq. cm max. A gauge may be put by removing plug. After filling close these connections.

iv. Remove air release plugs provided on top of the conservator.

v. Slowly pump the oil through main reactor / drain valve. Temporarily stop filling operation when oil starts coming from opening after ensuring that no air bubbles come out through these air release holes. Fit the two air release plugs.

vi. Continue oil filling till oil start coming from air release plug stop oil after ensuring that no air bubbles come out. Fit the plug.

vii. Now release the air pressure held inside the air cell from point and continues oil filling until magnetic oil gauge indicates 35˚C level.

viii. Remove oil pump and connect air cell to breather from point. Also remove pressure gauge and put plug.

ix. The system is now properly filled. Air release plugs are fitted in normal operation.

10.29.8 **EQUIPMENT FOR OIL0FILLING UNDER VACUUM**

i. High-vacuum 2 storage oil filtration plant provided with thermostat-controlled oil heaters and vacuum-proof hoses with dependent vacuum pumping system for tank evacuation. Capacity: 6 kl/hr

ii. Oil-storage tanks provided with silica-gel breathers and inlet / outlet valves for oil circulation. Recommended capacity 20kl

iii. Vacuum gauges provided in filtration plant.

iv. Equipment for measurement of electric strength (BDV) of oil - 100 kV set.
v. Equipment for moisture content of oil.
vi. Equipment for measurement of Resistivity and Tan delta at 90˚C.
vii. Transparent vacuum-proof tubes for checking of oil-level during oil filling.
viii. Valves, fitting, gaskets etc.
ix. Dry nitrogen cylinders.

10.29.9 **COMMISSIONING**

Testing after Assembly of the Transformer

After the transformer has been assembled at site, it shall be tested in order to check that it has not been damaged during transport and assembly to such an extent that its future operation will not be at risk. Regarding the performance of the test, refer to the testing method as per standards. The results of the test shall be documented.

10.29.10 **COMMISSIONING CHECKS**

i. Breather Silica gel (Blue when dry)
ii. Oil in the Breather housing cup.
iii. All valves for their correct opening and closing sequence.
iv. Oil level in conservator tank.
v. Oil in cooling system.
vi. Oil level in bushings.
vii. Release air, wherever necessary.
viii. Cooling accessories (Pump motors, Fan motors etc.) for direction and O/L setting.
ix. Buchholz, oil level indicator, pressure gauges, thermometer, temperature indicators etc.
x. Neutral earthing.
xi. Earth Resistance of Electrodes.
xii. Earthing of bushing test tap.
xiii. Check oil leakage for 24 hrs.
xiv. Check Auxiliary circuit voltage (415 V)
xv. Calibration of OTI / WTI with hot oil.
xvi. Check Working of WTI / RTD repeaters at control room.
xvii. IR of core to earth.
xviii. Die electric strength of oil PPM & Chemical analysis, specific gravity test
xix. IR tests on windings to earth and between winding
xx. Phase sequence test & vector group check
xxi. Continuity test
xxii. No load voltage ratio on all tap position
xxiii. Winding resistance in all taps
xxiv. Tap changing at 415V 50 Hz supply in all three phases
xxv. TAN-DELTA tests if quality check list calls for.
xxvi. Dew point check for N2 Gas at the time of oil filling

10.29.11 **INSULATION RESISTANCE TEST**

S. No.	Description	Date	Time in Hrs	Megger (See note (3)	IR Value	Temp	Remarks
1.	Control wiring						
2.	Tap Changer						
a)	Motor						
b)	Control						
3.	Cooling system						
a)	Motor Fan						
b)	Motor pump						
c)	Control Wiring						

4.	Main Winding						
a)	HV/E+LV						
b)	LV/E+HV						
c)	HV/IV						
d)	IV/LV						
e)	HV/LV						

Note:-

(1) While checking these values no external, lightning arrestors etc should be in circuit.

(2) Special care should always be taken while meggering the transformer winding to ensure that there is no leakage in the leads.

(3) Megger voltage to be decided based on the voltage rating of equipment under test.

10.29.12 **OIL CHARACTERISTICS**

Take necessary precaution (regarding rinsing the bottle, cleaning of hand, air bubbles etc) while withdrawing the samples. Each sample should be free of air bubbles and should not be tested when it is hot. The sample should satisfy IS: 1866.

i. Tank Top Sample Bottom Sample

ii. Cooling system Top Sample Bottom Sample

iii. OLTC Divertor (each phase)

10.29.13 **TESTS on CT (Location of CT maybe in HT Switchgear)**

i. Ratio

ii. Polarity

iii. Magnetising current

iv. IR Value

10.29.14 **TESTS on PT (Location of PT maybe in HT Switchgear)**

v. IR test of primary winding by HV megger between windings

vi. IR test of secondary winding by LV megger between winding and winding to earth

vii. Checking of voltage ratio

viii. Verification of terminal markings and polarity

ix. Checking of oil level if applicable

x. Checking of continuity and IR values for cables from PT to M

xi. Checking tightness of earthing connection.

xii. Checking of insulator for cracks.

xiii. Checking output on charging of the system with connected meter

Note:

1) While operating the mechanism on Electrical Control, check limit switches, step by step contractor, over running device etc. once again for their actual operation and prove that they are functioning properly.

2) For More Details, please refer Respective Manuals from the OEM.

10.30 GUIDELINES FOR ERECTION OF HT SWITCHGEAR PANELS

10.30.1 **Erection**

a) The base frames will be supplied normally along with the boards. These will have to be aligned, levelled and grouted in position as per approved drawings. Wherever the base channels are not available, the same will have to be fabricated and painted at site. Base frames shall be grouted on the openings which shall be made on the floor during the time of casting. All necessary concrete chipping and finishing works are to be completed.

b) All the panels/board shall be placed on its foundation or supporting structures and shall be assembled as required. All panels should be installed with parallel, horizontal and vertical alignment by skilled craftsmen.

c) All the boards will be delivered in sections. Necessary interconnection of busbar, bolting of panels, left out panel / interpanel wiring, etc. will have to be done after assembling the panel.

10.30.2 **The Following Points shall be Checked up During Erection**

i. Layout of foundation channels.
ii. Floor level covered by the panel with respect to main floor level.
iii. Location and serial no. of panels.
iv. Positioning of panels.
v. Verticality of switchgear panels within the limit specified.
vi. Freeness of Breaker Truck and modules in housing and its manual operation.
vii. Earthing of panels and breaker truck to station earth.
viii. Lugs for termination of HT and LT cables.
ix. Mounting and fixing arrangements of Bus bars.
x. Tightening of Busbar jointing bolts as specified.
xi. Clearance between:
- Phase to Phase
- Phase to earth

xii. Minimum clearance for:
- Breaker, Truck and modules withdrawal
- Distance required for maintenance work

xiii. Check the operation of:
- Remote control
- Various required - closing / tripping / alarm / indications / interlocks

xiv. Installation position of instruments and relays
xv. Operation of relays and meters by secondary injection.
xvi. 15. AC/DC supplies for panel
xvii. 16. Final relay settings as per customer requirements.
xviii. 17. Tightness of terminal connections for HT & LT connections.
xix. 18. Opening operation of breaker, manually and electrically.
xx. 19. Working of ammeters and voltmeters for their entire range and other panel mounted instruments like recorder, indicator etc.

10.30.3 **HT SWITCHGEAR TESTS**

i. IR test
ii. HV one minute P.F. test checking of oil level
iii. Measurement of contact resistance for HT breakers
iv. Test to prove inter changeability of similar parts (including breaker module)
v. Testing of relays as per supplier's commissioning manual
vi. Testing and calibration of all meters.
vii. Operation of all relays by secondary injection method
viii. Testing of CT polarities and CT ratio by primary injection test.
ix. Measurement of knee point voltage and secondary resistance for CTs used for differential protection.
x. IR and voltage ratio test for PTs
xi. Functional test of all circuit components for each panel / feeder.
xii. Test to prove closing/tripping operation at minimum and maximum specified voltage in test and service position.
xiii. Check for drawout test and service position of breakers for all feeders.
xiv. Check for covering of all openings in the panel - check for continuity and operation of

aux. contacts of breaker.

xv. HV test on vacuum interrupters (for VCBs)

xvi. Check for pressure of SF6 gas and air (for SF6).

10.31 LT SWITCHGEAR PANELS

10.31.2 **Erection**

a) The base frames will be supplied normally along with the boards or shall be fabricated at site with steel supplied in the BOQ. These will have to be aligned, levelled and grouted in position as per approved drawings. Wherever the base channels are not available, the same will have to be fabricated and painted at site. Base frames shall be grouted on the openings which shall be made on the floor during the time of casting. All necessary concrete chipping and finishing works are to be completed and within this contract.

b) All the panels/board shall be placed on its foundation or supporting structures and shall be assembled as required. All panels should be installed with parallel, horizontal and vertical alignment by skilled craftsmen

c) All the boards will be delivered in sections. Necessary interconnection of busbar, bolting of panels, left out panel / inters panel wiring, etc. will have to be done after assembling the panel.

d) Earthing Pit for the body and neutral 2 Nos each is to be made as per the drg. The same shall be quoted in the E&C rate.

10.31.3 Checks during erection

i. Layout of foundation channels.

ii. Floor level covered by the panel with respect to main floor level.

iii. Location and serial no. of panels.

iv. Positioning of panels.

v. Verticality of switchgear panels within the limit specified.

vi. Freeness of Breaker Truck and modules in housing and its manual operation.

vii. Earthing of panels and breaker truck to station earth.

viii. Lugs for termination of LT cables.

ix. Mounting and fixing arrangements of Bus bars.

x. Tightening of Busbar jointing bolts as specified.

xi. Clearance between :

- Phase to Phase
- Phase to earth

xii. Minimum clearance for:

- Breaker, Truck and modules withdrawal
- Distance required for maintenance work

xiii. Check the operation of:

- Remote control
- Various required - closing / tripping / alarm / indications / interlocks

xiv. Installation position of instruments and relays

xv. Operation of relays and meters by secondary injection.

xvi. AC/DC supplies for panel

xvii. Final relay settings as per customer requirements.

xviii. Tightness of terminal connections for HT & LT connections.

xix. Opening operation of breaker, manually and electrically.

xx. Working of ammeters and voltmeters for their entire range and other panel mounted instruments like recorder, indicator etc.

10.31.4 LT Switchgear tests

i. IR test

ii. Measurement of contact resistance for LT breakers
iii. Test to prove inter changeability of similar parts (including breaker module
iv. Testing of relays as per supplier's commissioning manual.
v. Testing and calibration of all meters.
vi. Operation of all relays by secondary injection method.
vii. Testing of CT polarities and CT ratio by primary injection test.
viii. Measurement of kneepoint voltage and secondary resistance for CTs used for differential protection
ix. IR and voltage ratio test for PTs
x. Functional test of all circuit components for each panel / feeder
xi. Test to prove closing / tripping operation at minimum and maximum specified voltage in test and service position
xii. Check for drawout test and service position of breakers for all feeders
xiii. Check for covering of all openings in the panel - check for continuity and operation of aux. contacts of breaker.

10.32 TESTING OF CABLES:

a) The contractor shall submit to the Engineer a checklist for testing and commissioning and the activities shall be carried out in accordance with the checklist.
b) Testing and electrical measurement of cable installations shall conform to IS: 1255
c) Prior to installation, cables shall be tested for:
i. Continuity of conductors
ii. Insulation resistance between conductors & earth
iii. Insulation resistance between conductors.
d) After installation cables shall be tested for:
i. Insulation resistance between conductors & iron
ii. Insulation resistance between conductors & earth
iii. Conductor resistance
iv. Capacitance between conductors & earth (if required)
v. DC high voltage test (for LT power cables of higher sizes interconnecting PCCs& MCC)
vi. Absence of cross phasing
vii. Firmness of terminations.

10.33 NOTE:

The tests specified above for all the electrical equipment are not exhaustive. Any other pre-commissioning and field tests not included in the above list but necessary as per relevant standards, Electricity rules, code of practice and as instructed by the manufacturer of the equipment shall also have to be carried out if deemed as per requirement either within the quoted rates / price or at additional cost. Decision of Engineer in charge will be the final regarding additional cost for testing. The contractor shall take the full responsibility of testing, commissioning, trial run and successful operation of the equipment.

Test certificates of the vendor scope items, where ever necessary same should be produced by the bidder long with the dispatch documents/ Invoice of the supplied items.

BOQ FOR SUPPLY, ERECTION & COMMISSIONING OF CONSTRUCTION POWER SUPPLY SYSTEM AT 2x800MW NTPC LARA PROJECT				
S. No.	**DESCRIPTION**	**UOM**	**QUANTITY**	**Factor Components**
BILL OF QUANTITIES FOR PACKAGE-A				
1.00	**PREPARATION OF DRAWING & OBTAINING STATUTORY APPROVAL**			
1.01	Route survey, preparation of route drawing, Detailed SLD, Detailed 11/11.5kV and 11kV/433V substation drawing, 11kV distribution drawing, Two/Four/Six/Eight pole structure arrangement drawing, Earthing layout, sag calculation for OH line & any other document /drawing as required by Electrical inspectorate and getting approval of above from statutory authority and also includes liaison with electrical inspectorate for field inspection and obtaining clearance certificate for charging the entire system in a phased manner as per site requirement (any number of times till completion of entire scope under this contract.)	Lump sum	1	0.01004125993873870
2.00	**SUPPLY PORTION OF BOM FOR 11kV OH LINES/ CABLES/ SUBSTATIONS ETC.**			
2.01	**11kV/11.5kV SUBSTATION RELATED ITEMS.**			
2.01.01	Supply of Lightning arrestor set suitable for 11kV as per ISS/IEC Spec No. IS:3070/2-1985/Latest. (Each set consist of all 3 Phases).	Sets	2	0.00035768674538827
2.01.02	Supply of 11kV pin insulator with GI pin as per IS:731-1971 IS:2486 Part-II – 1989. (Each set consist of all 3 Phases).	Sets	8	0.00014307469815531
2.01.03	Supply of 11kV disc insulator with fixing arrangements & conductor holding clamps as per IS:3188/1965 & IEC 309/1969/Latest. (Each set consist of all 3 Phases).	Sets	4	0.00020030457741743
2.01.04	Supply of 11kV 400A Air break switch-double break-horizontal mounting rotating type as per ISS/IEC Spec No.4710/1968-265-C/1970/Latest.	Nos.	3	0.00193150842509668
2.01.05	Supply of 11kV HG fuse as per ISS/IEC Spec IS: 9385/Latest. (Each set consist of all 3 Phases)	Sets	4	0.00051506891335911
2.01.06	Supply of 11kV DO fuse as per ISS/IEC Latest. (Each set consist of all 3 Phases)	Sets	2	0.00035768674538827
2.01.07	Supply of Pole ISMB-250 11m for 11kV Height for Overhead line two/four/six/eight	Nos.	8	0.00286149396310619

	pole steel structure at Sub Station.			
2.01.08	Supply of Pole ISMB-250 13 m for 11kV Height for Overhead line two/four/six/eight pole steel structure at Sub Station or increasing the height of the overhead line as per site requirement.	Nos.	12	0.00686758551145485
2.01.09	Supply of ISMC-100 for cross beam for Overhead line two/four/six/eight pole steel structure at Sub Station.	MT	3	0.00386301685019335
2.01.10	Supply of ISMC-75 for cross beam for Overhead line two/four/six/eight pole steel structure at Sub Station.	MT	1	0.00128767228339778
2.01.11	Supply of 2kVA 230V 1 phase sine wave UPS of reputed make with 2 nos. of exide make 150AH 12V tubular lead acid batteries. Vendor shall submit relevant certificates along with supply.	Sets	2	0.00214612047232964
2.01.12	Supply of 50kVA 3 phase 4 wire 11kV/433V copper wound DYN11 oil filled out door plinth mounted Distribution transformer of reputed make to provide auxiliary power supply to 11/11.5kV sub station and illumination etc.	Nos.	1	0.00715373490776547
2.01.13	Supply of 125A out door type Floor mounted Power distribution board (PDB), IP 55 protection, Double Door type, Incomer-01 no. 125A TPN MCCB. Outgoing-02 nos. 63A TPN ELCBs with 30mA tripping, 03 nos. 40A TPN ELCBs with 30mA tripping, 02 nos. 32 A TPN ELCBs with 30mA tripping with Timer & contactors for auto on/off and 3 indicating lamps with fuse for indication bus supply ON, Digital voltmeter & VSS 0-500V, suitable bus bar arrangement for phase and neutral. Sufficient space should be provided in the removable cable gland plate to accommodate minimum 1Rx3.5Cx70/ 3.5Cx95 sq. mm. Al incoming cable and outgoing cables of different sizes. All MCCB, MCBs and ELCBs shall be of reputed make.	Nos.	1	0.00178843372694137
2.01.14	Supply of operator remote control desk/Relay control panel with chair for operating the 11kV/11.5kV Substation consisting of 02 Nos. of 2.5 MVA 11kV/11.5kV and 50kVA 11kV/0.440kV Transformers, 02 Nos. of 11kV Outdoor Ring Main Unit and 02 Nos. Outdoor Vacuum Circuit Breakers. This remote control desk/relay control panel shall control all operation points of Substation i.e. control supply on status, UPS and bat-	Set	1	0.00178843372694137

	tery healthiness, main supply on status for 11kV/11.5kV and 11kV/0.440kV transformers, RMUs & VCBs. Other healthiness monitoring which includes breaker on/off status, trip circuit healthy indication, relay coordination & trip alarm annunciation window etc. The panel shall be approved by BHEL.			
2.02	**11kV OVERHEAD RING MAIN LINE RELATED ITEMS.**			
2.02.01	Supply of 9 m long 280kg working load prestressed cement concrete poles (PSCC) as per IS:1678.	Nos.	180	0.03090413480154680
2.02.02	Supply of Pole ISMB-250 11 m for 11kV Height for Overhead line two/four pole steel structure at Sub Station.	Nos.	36	0.02060275653436450
2.02.03	Supply of ISMC-100 for cross beam for Overhead line two/four pole steel structure at Sub Station.	MT	6	0.00772603370038670
2.02.04	Supply of ISMC-75 for cross beam for Overhead line two/four pole steel structure at Sub Station.	MT	1	0.00128767228339778
2.02.05	Supply of 11kV 'V' Cross arms/Straight Arm with suitable back clamps including supply of necessary fasteners as per IE specification.	Nos.	180	0.01030137826718230
2.02.06	Supply of 11kV GI stay (7/3.15mm) sets with Guy, Bow, Stay Rod, wire etc. as per I.E. Specifications. (Each set consist of all 3 Phases).	Sets	180	0.01931508425096680
2.02.07	Supply of 11kV top fittings (I Clamp) with suitable back clamps including supply of necessary fasteners as per IE specification.	Nos.	180	0.00321918070849446
2.02.08	Supply of 11kV disc insulator with fixing & conductor and holding clamp as per IS: 3188/1965 & IEC 309/1969/Latest. (Each set consist of all 3 Phases).	Sets	50	0.00250380721771791
2.02.09	Supply of 11kV pin insulator with pins as per IS: 2544/1963 AMD 125 & IEC 168/1969 Latest. (Each set consist of all 3 Phases).	Sets	180	0.00321918070849446
2.02.10	Supply of 11kV 400A Air break switch-double break-horizontal mounting rotating type as per ISS/IEC Spec No.4710/1968-265-C/1970/Latest.	Nos.	18	0.01158905055058010
2.02.11	Supply of 11kV 400A Air break switch-double break-Vertical mounting rotating type as per ISS/IEC Spec No.4710/1968-265-C/1970/Latest.	Nos.	12	0.00772603370038670

2.02.12	Supply of 11kV Lightning arrestor set as per ISS/IEC Spec No. IS:3070/2-1985/Latest. (Each set consist of all 3 Phases).	Sets	12	0.00214612047232964
2.02.13	Supply of 11kV HG fuse as per ISS/IEC Spec IS: 9385/Latest. (Each set consist of all 3 Phases)	Sets	12	0.00154520674007734
2.02.14	Supply of 11kV DO fuse as per ISS/IEC Latest. (Each set consist of all 3 Phases)	Sets	12	0.00214612047232964
2.02.15	Supply of outdoor type weather proof 630A capacity 11kV Pillar box IP 55 Protection as per IS with one no. Incoming and two nos. outgoing including supply of accessories.	Nos.	3	0.00536530118082410
2.02.16	Supply and fixing of anti-climb device (barbed wire) roled on the poles at 2m height as per I.E. specification and numbering of poles.	Sets	180	0.01931508425096680
2.03	**COMMON ITEMS FOR 11kV OH LINES AND SUBSTATION EQUIPMENTS.**			
2.03.08	Supply of 65x10 mm GI earth flat.	Meters	310	0.00332648673211094
2.03.09	Supply of 50x6 mm GI earth flat.	Meters	382	0.00196756324903181
2.03.10	Supply of 25x3 mm GI earth flat.	Meters	242	0.00069248153907170
2.03.11	Supply of 8SWG wire	Meters	3900	0.00167397396841712
2.03.12	Supply of Required MS/GI/Nickel cadmium fasteners/anchor fasteners for erection of all supply materials and completion of entire works covered under this package. (M6 to M16).	kg	100	0.00035768674538827
2.03.13	Supply of Heat shrink type HT Indoor/Outdoor termination kits of reputed make suitable for 3Cx185/ 3Cx240 sqmm 11kV Cables including for RMUs. The exact details of RMU end termination shall be shared separately (touch proof/ normal).	Nos.	72	0.01545206740077340
2.03.14	Supply of Heat shrink type HT straight through jointing kits of reputed make for 3Cx185/ 3Cx240 sqmm 11kV Armoured Cables.	Nos.	22	0.00786910839854201
2.03.15	Supply of 200mm dia RCC hume pipes for make use of cable crossing where ever required such as existing culverts, trenches and road etc for HT Cables.	Meters	180	0.00309041348015468
2.03.16	Supply of 150mm NB 4.8mm thick medium class GI pipes for make use of cable crossing where ever required such as existing culverts, trenches and road etc for LT Cables.	Meters	180	0.00193150842509668
2.03.17	Supply of Fire Buckets with stand floor mounted type of rigid & good quality-4 nos. 10 ltr capacity Fire buckets per stand-Type & make shall be approved by BHEL/ Engi-	Sets	14	0.00080121830966973

	neer.			
2.03.18	Supply of Aluminium alloy 5kg CO2 fire extinguisher industrial type with ISI Mark of reputed make. Type & make shall be approved by BHEL/ engineer.	Nos.	14	0.00090137059837845
2.03.19	Supply of HT cable route markers standard size with 1m height angle support.	Nos.	250	0.00268265059041205
2.03.20	Supply of LT cable route markers standard size with 1m height angle support.	Nos.	305	0.00327283372030270
2.03.21	Supply and fixing of Griddle Guards of length 15m, with 8SWG GI Wire for Road crossing with necessary fixing arrangement etc, as per IS Specification.	Nos.	12	0.03004568661261500
2.03.22	Supply of outdoor type metal clad LT distribution board (LTDB) having IP -55 Protection, one incomer with 400A TPN CHANGE OVER SWITCH for EB supply & DG SET POWER SUPPLY and 2 nos. 200 A and 2 nos. outgoing feeders with 63 A TPN ELCBs, 3 indicating lamps with fuse for indication bus supply ON, Voltmeter & VSS 0-500V etc. Sufficient space should be provided for the removable cable gland plate to accommodate the power cable and all outgoing cables from suitable connectors from each MCB/ELCB. Neutral link bar for incoming and outgoing neutrals.	Nos.	2	0.00357686745388273
2.04	**FOR AREA LIGHTING RELATED ITEMS.**			
2.04.01	Supply of steel tubular swaged poles, 9 mtr long made of sheet steel having ultimate tensile strength 42 kg F/sq. mm conforming to BIS: 2713 (part-II) complete with 300x300x6 mm thick MS base plate for welding at site and size as per configuration given in BIS for 410 SP-28 (113 kg- pole weight) .	Nos.	162	0.03708496176185620
2.04.02	Supply of Electrical junction box (GI/PVC)of good quality to suit the opening available in above lighting pole, one connector block for 3 Phase 4 wire incoming and outgoing cable to next street light pole with 01 no. 6A SP MCB for street light and earthing etc.	Nos.	171	0.00611644334613947
2.04.03	Supply of 90W LED street light fitting of make Philips/CGL/Bajaj/Havells/Wipro only.	Nos.	195	0.01339179174733700
2.04.05	Supply of 50mm NB 3.6mm thick medium class standard GI pipe for incoming and outgoing cables.	Meters	426	0.00548548392727456

2.04.06	Supply of outdoor type metal clad Lighting distribution board (LDB) having IP-55 protection with double door type and one incomer with 100A TPN MCCB additionally with 3 nos. 32 A TPN ELCBs with 30mA tripping and timer & contactors for auto on/off street lights and 3 indicating lamps with fuse for indication bus supply ON, Digital Voltmeter & VSS 0-500V etc. Suitable busbar arrangement for Phase and Neutral. Sufficient space should be provided in the removable cable gland plate to accommodate incoming power cable and all outgoing cables.	Nos.	10	0.01287672283397780
BILL OF QUANTITIES FOR ERECTION, TESTING AND COMMISSIONING				
2.05	**11kV/11.5kV SUBSTATION RELATED ITEMS.**			
2.05.01	Erection of Lightning arrestor set suitable for 11kV as per ISS/IEC Spec No. IS:3070/2-1985/Latest. (Each set consist of all 3 Phases).	Sets	2	0.00017168963778637
2.05.02	Erection of 11kV pin insulator with GI pin as per IS:731-1971 IS:2486 Part-II – 1989.(Each set consist of all 3 Phases).	Sets	8	0.00004578390340970
2.05.03	Erection of 11kV disc insulator with fixing arrangements & conductor holding clamps as per IS:3188/1965 & IEC 309/1969/Latest. (Each set consist of all 3 Phases).	Sets	4	0.00006867585511455
2.05.04	Erection of 11kV 400A Air break switch-double break-horizontal mounting rotating type as per ISS/IEC Spec No.4710/1968-265-C/1970/Latest.	Nos.	3	0.00064383614169889
2.05.05	Erection of 11kV HG fuse as per ISS/IEC Spec IS: 9385/Latest. (Each set consist of all 3 Phases)	Sets	4	0.00068675855114549
2.05.06	Erection of 11kV DO fuse as per ISS/IEC Latest. (Each set consist of all 3 Phases)	Sets	2	0.00034337927557274
2.05.07	Erection of Pole ISMB-250 11m for 11kV Overhead line two/four/six/eight pole steel structure at Sub Station. The erection includes excavation of earth of size 1x1x1.8m depth, fasteners, foundation bolt, grouting with concrete of ratio 1:4:8 for size of 1x1x1.8m depth including supply of cement, sand, metal etc for the foundation and coping of poles by 1 feet height.	Nos.	8	0.00091567806819398

2.05.08	Erection of Pole ISMB-250 13 m for 11kV Height for Overhead line two/four/six/eight pole steel structure at Sub Station or increasing the height of the overhead line as per site requirement. The erection includes excavation of earth of size 1x1x1.8m depth, fasteners, foundation bolt, grouting with concrete of ratio 1:4:8 for size of 1x1x1.8m depth including supply of cement, sand, metal etc for the foundation and coping of poles by 1 feet height.	Nos.	12	0.00171689637786371
2.05.09	Erection of ISMC-100 for cross beam for Overhead line two/four/six/eight pole steel structure at Sub Station.	MT	3	0.00171689637786371
2.05.10	Erection of ISMC-75 for cross beam for Overhead line two/four/six/eight pole steel structure at Sub Station.	MT	1	0.00057229879262124
2.05.11	Erection, testing and commissioning of 2kVA 230V 1 phase sine wave UPS of reputed make with 2 nos. of exide make 150AH 12V tubular lead acid batteries.	Sets	2	0.00035768674538827
2.05.12	Erection, testing and commissioning, including oil filtration and submission of oil test report of 50kVA 3 phase 4 wire 11kV/433V copper wound DYN11 oil filled out door plinth mounted Distribution transformer of reputed make to provide power supply to 11/11.5kV sub station and illumination etc.	Nos.	1	0.00107306023616482
2.05.13	Erection, testing and commissioning of operator remote control desk/Relay control panel with chair for operating the 11kV/11.5kV Substation consisting of 02 Nos. of 2.5 MVA 11kV/11.5kV and 50kVA 11kV/0.440kV Transformers, 02 Nos. of 11kV Outdoor Ring Main Unit and 02 Nos. Outdoor Vacuum Circuit Breakers. This remote control desk/relay control panel shall control all operation points of Substation i.e. control supply on status, UPS and battery healthiness, main supply on status for 11kV/11.5kV and 11kV/0.440kV transformers, RMUs & VCBs. Other healthiness monitoring which includes breaker on/off status, trip circuit healthy indication, relay coordination & trip alarm annunciation window etc. The panel shall be approved by BHEL.	Set	1	0.00035768674538827

2.05.14	1. Supply of materials as required and mentioned below for erection, testing & commissioning of 2 bays 11/11.5kV substation consists of 2 nos 2.5MVA 11/11.5kV Transformer, 02 Nos. 11kV RMUs & 02 Nos. 11kV VCBs with allied works. This includes E&C of 2 nos 2.5MVA 11/11.5kV Transformer, 02 Nos. 11kV RMUs & 02 Nos. 11kV VCBs with allied works as described below. A- Levelling of substation yard, supply and spreading of 40mm size stone aggregate of 100 mm thick for an area of size approx. 40 m x 20 m, supply and construction of brick work with cement mortar 1:6 of 230 mm thick and 450 mm height all around the substation yard, plastering the brick work in CM 1:6 etc. B- Supply and construction of RCC foundation as per scheme drawing for 11kV RMUs - 02 nos., 11/11.5kV 2.5MVA Transformers -2 nos & 11kV VCBs -2nos. Appx size 3.5m x 3m x4m (LXBXH) from ground level and including excavation of plinth pit and base concreting and plastering, white washing etc. including construction of Fire Wall in between 02 nos. 2.5MVA transformer and oil soak pit as per IE standard and as per detailed layout Drg. C- Supply and fixing of 3.15mm GI chain linked wire fencing height 2 m for the substation of appx size 40m x 20m. Grouting of 3m height ISA 75 fabricated posts at an interval of 1.5m (2m vertical 0.5m slanting, 0.5m grouting). Three runs of barbed wire along with the fencing on the slanting angle post, fixing of mesh with post by 50x6mm MS flat with fasteners (2 nos./post) and earthing of fencing by 25x3 GI flat and providing finish aluminium painting of all steel materials etc. D- Supply and installation of 3m x 2m height double door type MS gate made of Angle, channel/rolled sections including supply and fixing of hinges, fasteners, locking arrangement etc, including providing of finish aluminium painting .	Set	1	0.04006091548348660

	E- Supply and Erection of 3m long 50mm dia 3.6 mm thick medium class GI funnel type earth electrode with filling of bentonite earthing powder as per standard, four side brick work chamber with cement plastering, white washing and removable type RCC/ cast iron cover plate. Scope includes supply of required bentonite earthing powder, cement, brick, sand, RCC/cast iron cover plate. Making of earth mat using 65X10 mm GI flats for main equipment body earthing & neutral earthing, 25x5 flat for LA earthing and others. Minimum 10 earth pits for earth Mat & Body earthing , 4 nos. for Neutral earthing and 04 nos. for LA earthing and as per detailed layout.			
	Installation/Erection of steel tubular swaged poles, 9 mtr long made of sheet steel having ultimate tensile strength 42 kg F/sq. mm conforming to BIS: 2713 (part-II) complete with 300x300x6 mm thick MS base plate for welding at site and size as per configuration given in BIS for 410 SP-28 (113 kg- pole weight) with 1.5 mtr deep excavation, concreting in 1:4:8 ratio size 45 cms x 45 cms x 150 cms and pole plinth in 1:3:6 cement concreting having 300 mm height and 300 mm dia including double earthing of pole with suitable arrangement, duly painted with two coats of red oxide paint and one coat of aluminium paint to be applied after erection; the length of pole below ground to be painted with two coats of black bituminous paint. the pole shall be complete with JB, fuse and minor fabrication as below :i) Drilling 20 mm dia hole at about 2.5 mtr from ground level for wire leads from junction box to light fixture.ii) Drilling 15mm dia holes at about 0.7 and at 2.5 mtr from ground level and welding 12 mm nuts for using a 12 mm GI bolt for fastening earth conducters. iii) Welding required holes for fixing pole cap of street light bracket.iv) Welding diametrally 10 mm MS round 30 mm below pole top edge for clipping wire leads.Erection of Electrical junction box (GI/PVC)of good quality to suit the opening available in above lighting pole, one connector block for 3 Phase 4 wire incoming and outgoing cable to next street light pole with 01 no. 6A SP MCB for street light and			

	earthing etc.Erection of 90W LED street light fitting of make Philips/CGL/Bajaj/Havells/Wipro only.Total 06Nos. of street light per substation.Supply rates provided separately.			
	G-Erection, testing and commissioning of 125A out door type Floor mounted Power distribution board (PDB), IP 55 protection, Double Door type, Incomer-01 no. 125A TPN MCCB. Outgoing-02 nos. 63A TPN ELCBs with 30mA tripping, 03 nos. 40A TPN ELCBs with 30mA tripping, 02 nos. 32 A TPN ELCBs with 30mA tripping with Timer & contactors for auto on/off and 3 indicating lamps with fuse for indication bus supply ON, Digital voltmeter & VSS 0-500V, suitable bus bar arrangement for phase and neutral. Sufficient space should be provided in the removable cable gland plate to accommodate minimum 1Rx3.5Cx70/ 1Rx3.5Cx95 sq. mm. incoming cable and outgoing cables of different sizes. All MCCB, MCBs and ELCBs shall be of reputed make.			
	H- Supply & fixing of 15 nos. 11 kV safety danger boards of standard size (Per Substation).			
2.06	**11kV OVERHEAD RING MAIN LINE RELATED ITEMS AND PSS**			
2.06.01	Stringing of ACSR DOG conductors as per IS:398/1961 (To meet 3 phases/lines)	Meters	17000	0.01459361921184160
2.06.02	Erection of 9 m long 280kg working load pre-stressed cement concrete poles (PSCC). The erection includes excavation of earth of size 1x1x1.8m depth, grouting with concrete of ratio 1:4:8 for size of 1x1x1.8m depth including supply of cement, sand, metal etc. for the foundation and coping of poles by 1 feet height.	Nos.	180	0.01158905055058010
2.06.03	Erection of Pole ISMB-250 11 m Height for 11kV Overhead line two/four/six/eight pole steel structure at Sub Station. The erection includes excavation of earth of size 1x1x1.8m depth, fasteners, foundation bolt, grouting with concrete of ratio 1:4:8 for size of 1x1x1.8m depth including supply of cement, sand, metal etc for the foundation and coping of poles by 1 feet height.	Nos.	36	0.00412055130687291
2.06.04	Erection of ISMC-100 for cross beam for Overhead line two/four/six/eight pole steel structure at Sub Station.	MT	6	0.00343379275572742

2.06.05	Erection of ISMC-75 for cross beam for Overhead line two/four/six/eight pole steel structure at Sub Station.	MT	1	0.00057229879262124
2.06.06	Erection of 11kV 'V' Cross arms/Straight Arm with suitable back clamps including erection of necessary fasteners as per IE specification.	Nos.	180	0.00154520674007734
2.06.07	Erection of 11kV GI stay (7/3.15mm) sets with Guy, Bow, Stay Rod, wire etc. as per I.E. Specifications. (Each set consist of all 3 Phases).	Sets	180	0.00643836141698892
2.06.08	Erection of 11kV top fittings (I Clamp) with suitable back clamps including erection of necessary fasteners as per IE specification.	Nos.	180	0.00103013782671823
2.06.09	Erection of 11kV disc insulator with fixing & conductor and holding clamp as per IS: 3188/1965 & IEC 309/1969/Latest. (Each set consist of all 3 Phases).	Sets	50	0.00042922409446593
2.06.10	Erection of 11kV pin insulator with pins as per IS: 2544/1963 AMD 125 & IEC 168/1969 Latest. (Each set consist of all 3 Phases).	Sets	180	0.00103013782671823
2.06.11	Erection of 11kV 400A Air break switch-double break-horizontal mounting rotating type as per ISS/IEC Spec No.4710/1968-265-C/1970/Latest.	Nos.	18	0.00386301685019335
2.06.12	Erection of 11kV 400A Air break switch-double break-vertical mounting rotating type as per ISS/IEC Spec No.4710/1968-265-C/1970/Latest.	Nos.	12	0.00206027565343645
2.06.13	Erection of 11kV Lightning arrestor set as per ISS/IEC Spec No. IS:3070/2-1985/Latest. (Each set consist of all 3 Phases).	Sets	12	0.00103013782671823
2.06.14	Erection of 11kV HG fuse as per ISS/IEC Spec IS: 9385/Latest. (Each set consist of all 3 Phases)	Sets	12	0.00206027565343645
2.06.15	Erection of 11kV DO fuse as per ISS/IEC Lat-est. (Each set consist of all 3 Phases)	Sets	12	0.00206027565343645
2.06.16	Erection, testing and commissioning of out-door type weather proof 630A capacity 11kV Pillar box IP 55 Protection as per IS with one no. Incoming and two nos. out-going.	Nos.	3	0.00107306023616482
2.06.17	Erection and fixing of anti-climb device (barbed wire) roled on the poles at 2m height as per I.E. specification and number-ing of poles.	Sets	180	0.01030137826718230

2.06.18	Overhead Laying and Installation of HT & LT cables on poles including supply and installation of poles and all other accessories. HT Cable supply, laying and termination is excluded here and paid separately.	Meters	500	0.01073060236164820
2.06.19	Laying and Termination of 11kV 3Cx185/ 3Cx240sqmm Armoured HT Cable along with supply and installation of double compression type brass cable glands and required number of termination lugs of reputed make suitable (for Interconnection of Ring Main System and interconnection from customer's switchgear to 11/11.5kV construction power substation).	Meters	5000	0.01430746981553090
2.06.20	Supply of materials as required for erection, testing & commissioning of 11kV/433V Package Substation. A- Levelling of substation yard, supply and spreading of 40mm size stone aggregate of 75mm thick for an area of approx size 8m x 6m, supply and construction of Brick work with cement mortar 1:6 of 230 mm thick and 450 mm height all-round the substation yard, plastering the brick work in CM 1:6, white washing etc complete. (Per Sub Station). B- Supply and construction of foundation as per supplier foundation drawing for 500kVA/ 250kVA. Package Substation. Approx. size 4400 mm x 4400 mm x500 mm height (size may slightly vary as per new order of PSS) from ground level and including excavation of plinth pit and base concreting and plastering, white washing etc… as per the instruction of BHEL site engineer. C- Supply and fixing of 3.15mm GI chain linked wire fencing height 2m for the substation of size 8m x 6m including grouting of 3m height ISA 75 fabricated posts at an interval of 1.5m (2m vertical 0.5m slanting, 0.5m grouting) and three runs of barbed wire along with the fencing on the slanting angle post, fixing of mesh with post by 50x6mm MS flat with fasteners (2 nos./post) and earthing of fencing by 8 SWG GI wire and providing finish aluminium painting of all steel materials etc. Supplied structural steel materials are used for fencing posts .(Per Sub Station)	Set	12	0.06867585511454850

	D-. Supply and installation of 1m x 2m height MS gate made of MS Angle, channel/rolled sections including supply and fixing of hinges, locking arrangement etc including providing finish aluminium painting etc. (Per Sub Station)			
	E-Supply and Erection of 3m long 50mm dia 3.6 mm thick medium class GI funnel type earth electrode with filling of bentonite earthing powder as per standard, four side brick work chamber with cement plastering, white washing and removable type RCC/ cast iron cover plate. Scope includes supply of required bentonite earthing powder, cement, brick, sand, RCC/cast iron cover plate. Minimum 06 earth pits per substation. Substation earthing shall be carried out by using supplied 50x6, 25x6 and 25x3 mm earth flats (separate rate given for supply and E&C of earth flats.)			
	F-Supply and erection 2 nos. 5m height 3mm thick conical GI street light pole of reputed make with 40W LED street light fitting with base plate, foundation bolts and single lighting GI arm bracket with fasteners including supply all civil materials like cement, metal & sand etc for making foundation and cabling from LT panel. Supply and providing of necessary timer circuit for auto charging of lights. Make shall be approved by BHEL/ Engineer			
	G- supply and installation of two numbers vertical air terminations, 6m height 50 mm NB 3.6mm thick medium class GI Pipe with 1m height lightning spike on the top (total height -7m) with suitable Base plate & foundation bolts for Lightning protection of PSS. Vertical air terminal shall be grounded with earth pits. Required civil works for lightning pole erection and grouting including supply of grouting civil materials are in the scope of Contractor. (Per Sub Station)			
	H- Supply & Fixing of 06 nos. 11kV danger board of standard size (Per Sub Station).			
2.07	**COMMON ITEMS FOR 11kV OH LINES AND SUBSTATION EQUIPMENTS.**			
2.07.01	Laying and Termination of 3.5Cx240/ 300sqmm LT Power Cable along with supply and erection of double compression type brass cable glands and required number of termination lugs of reputed make suitable for interconnection of LTDB with Package	Meters	3000	0.00643836141698892

	Substation.			
2.07.02	Laying and termination of 3.5Cx70/ 3.5Cx95sqmm LT Power Cable along with supply and erection of double compression type brass cable glands and required number of termination lugs of reputed make suitable for Lighting LDB &50 kVA Aux. Transformer.	Meters	3100	0.00665297346422188
2.07.03	Laying and termination of 3.5Cx25sqmm LT Power Cable along with supply and erection of double compression type brass cable glands and required number of termination lugs of reputed make suitable for High Mast.	Meters	6500	0.01394978307014270
2.07.04	Laying and termination of 5Cx2.5sqmm LT Power Cable along with supply and erection of double compression type brass cable glands and required number of termination lugs of reputed make suitable for CT and PT Wiring from VCB's to Control Panels.	Meters	1450	0.00155593734243899
2.07.05	Laying and termination of 3Cx2.5sqmm LT Power Cable along with supply and erection of double compression type brass cable glands and required number of termination lugs of reputed make suitable for extending AC/DC control supply to VCB's and Xmers.	Meters	1000	0.00107306023616482
2.07.06	Laying and termination of 7C/9C/10Cx1.5sqmm LT Control Cable along with supply and erection of double compression type brass cable glands and required number of termination lugs of reputed make suitable for extending alarm, annunciation and protection VCB's and Xmers.	Meters	1000	0.00107306023616482
2.07.07	Supply of 1Cx10sqmm LT Control Cable along with supply and erection of double compression type brass cable glands and required number of termination lugs of reputed make suitable for earthing of high mast lighting arrangements.	Meters	1000	0.00107306023616482
2.07.08	Erection of 65 x 10 mm GI earth flat.	Meters	310	0.00066529734642219
2.07.09	Erection of 50 x 6 mm GI earth flat.	Meters	382	0.00065585441634394
2.07.10	Erection of 25 x 3 mm GI earth flat.	Meters	242	0.00034624076953585
2.07.11	Erection of 8SWG wire.	Meters	3900	0.00139497830701427
2.07.12	Erection of Required MS/GI/Nickel cadmium fasteners/ anchor fasteners for erection of all Erection materials and completion of entire works covered under this package (M6 to M16).	kg	100	0.00028614939631062

2.07.13	Erection of Heat shrink type HT In-door/Outdoor termination kits of reputed make suitable for 3Cx185/ 3Cx240 sqmm 11kV Cables including for RMUs. The exact details of RMU end termination shall be shared separately.	Nos.	72	0.00463562022023202
2.07.14	Erection of Heat shrink type HT straight through jointing kits of reputed make for 11kV 3Cx185/ 3Cx240 sqmm Armoured Cables.	Nos.	22	0.00236073251956260
2.07.15	Erection of 200 mm dia RCC hume pipes for making use of cable crossing where ever required such as existing culverts, trenches and road etc for HT Cables.	Meters	180	0.00128767228339778
2.07.16	Erection of 150mm NB 4.8mm thick medium class GI pipes for make use of cable crossing where ever required such as existing culverts, trenches and road etc for LT Cables.	Meters	180	0.00064383614169889
2.07.17	Erection of Fire Buckets with stand floor mounted type of rigid & good quality-4 nos. 10 liter capacity Fire buckets per stand-Type & make shall be approved by BHEL/ Engineer.	Sets	14	0.00090137059837845
2.07.18	Erection of Aluminium alloy 5kg CO2 fire extinguisher industrial type with ISI Mark of reputed make. Type & make shall be approved by BHEL/ engineer.	Nos.	14	0.00090137059837845
2.07.19	Erection of HT cable route markers standard size with 1m height angle support.	Nos.	250	0.00071537349077655
2.07.20	Erection of LT cable route markers standard size with 1m height angle support.	Nos.	305	0.00087275565874739
2.07.21	Erection and fixing of Griddle Guards of length 15m, with 8 SWG GI Wire for Road crossing with necessary fixing arrangement etc, as per IS Specification.	Nos.	12	0.01204951192648640
2.07.22	Erection of outdoor type metal clad LT distribution board (LTDB) IP -55 Protection with one incomer with 400A TPN CHANGE OVER SWITCH for EB supply & DG SET POWER SUPPLY and 2 nos. 200 A and 2 nos outgoing feeders with 63 A TPN ELCBs, 3 indicating lamps with fuse for indication bus supply ON, Voltmeter & VSS 0-500V etc. Sufficient space should be provided for the removable cable gland plate to accommodate the power cable and all outgoing cables from suitable connectors from each MCB / ELCB. Neutral link bar for incoming and outgoing neutrals. All MCCB, MCBs and ELCBs shall be of reputed make.	Nos.	2	0.00071537349077655

2.08	**FOR AREA LIGHTING RELATED ITEMS.**			
2.08.01	Installation/Erection of steel tubular swaged poles, 9 mtr long made of sheet steel having ultimate tensile strength 42 kg F/sq. mm conforming to BIS: 2713 (part-II) complete with 300x300x6 mm thick MS base plate for welding at site and size as per configuration given in BIS for 410 SP-28 (113 kg- pole weight) with 1.5 mtr deep excavation, concreting in 1:4:8 ratio size 45 cms x 45 cms x 150 cms and pole plinth in 1:3:6 cement concreting having 300 mm height and 300 mm dia including double earthing of pole with suitable arrangement, duly painted with two coats of red oxide paint and one coat of aluminium paint to be applied after erection; the length of pole below ground to be painted with two coats of black bituminous paint. the pole shall be complete with JB, fuse and minor fabrication as below : i) Drilling 20 mm dia hole at about 2.5 mtr from ground level for wire leads from junction box to light fixture. ii) Drilling 15mm dia holes at about 0.7 and at 2.5 mtr from ground level and welding 12 mm nuts for using a 12 mm GI bolt for fastening earth conductors. iii) Welding required holes for fixing pole cap of street light bracket. iv) Welding diametrically 10 mm MS round 30 mm below pole top edge for clipping wire leads.	Nos.	156	0.01673973968417120
2.08.02	Erection of Electrical junction box (GI/PVC)of good quality to suit the opening available in above lighting pole, one connector block for 3 Phase 4 wire incoming and outgoing cable to next street light pole with 01 no. 6A SP MCB for street light and earthing etc.	Nos.	165	0.00118036625978130
2.08.03	Erection of 90W LED street light fitting of make Philips/CGL/Bajaj/Havells/Wipro only.	Nos.	189	0.00540822359027069
2.08.04	Laying and termination of 2Cx2.5sqmm LT Cable along with supply and erection of double compression type brass cable glands and required number of termination lugs of reputed make suitable for power supply for street light poles.	Meters	11900	0.01276941681036140
2.08.05	Erection of 50mm NB 3.6mm thick medium class standard GI pipe for incoming and outgoing cables.	Meters	426	0.00121899642828324

2.08.06	Erection, testing and commissioning of out-door type metal clad Lighting distribution board (LDB) having IP-55 protection with double door type and one incomer with 100A TPN MCCB additionally with 3 nos. 32 A TPN ELCBs with 30mA tripping and timer & contactors for auto on/off street lights and 3 indicating lamps with fuse for indication bus supply ON, Digital Voltmeter & VSS 0-500V etc. Suitable busbar arrangement for Phase and Neutral. Sufficient space should be provided in the removable cable gland plate to accommodate incoming power cable and all outgoing cables.	Nos.	10	0.00357686745388273
2.09	**SUPPLY & ERECTION PORTION OF BOM FOR CIVIL RELATED WORKS.**			
2.09.01	Excavation of cable trench size 0.4x1.0 m depth in hard rock for HT cable and 0.4x0.8 m depth for LT cable. After cable laying, the trench will be back filled with excavated earth materials / other outside earth materials with compaction.	CUM	9600	0.05219364988705680
2.09.02	Supply & Erection and spreading of river sand in cable trench of 300 mm thick for protection of HT Power cable.	CUM	600	0.02575344566795570
2.09.03	Supply and laying of red/ ash bricks in the cable trench for protection of HT Power cable.	Nos	50000	0.02146120472329640
2.09.04	Construction of 5mX 4m size 10 feet height Control room, including supply of required civil materials like cement, sand, bricks, metal, reinforcement rods etc. The control room is concrete roof, brick wall room with inside & out site plastering, cement flooring with necessary trench arrangements for control desk & UPS and two nos 4ftX 4 ft glass alu. slide type windows, one wooden door of normal size (2.1X 1.2m) with lock & key arrangement. Including painting of control room. Supply & providing of control room lighting with minimum 4 nos. of 40 W Tube light fitting , 2 nos. 1200 sweep ceiling fans and 4 nos of 40 W LED street light fitting for outside area lighting, necessary electrical wiring for fans & lights with 02 nos 5A switched socket & 2 nos 15 A switched socket in lighting board, incoming main switch, earthing, incoming power connection etc. complete(Light fittings & fans are reputed make only).	Set	1	0.00929985538009511

2.09.05	Supply and installation of One No. vertical air terminations, 6m height 50 mm NB 3.6mm thick medium class GI Pipe with 1m height lightning spike on the top (total height-7m) with suitable Base plate &foundation bolts for Lightning protection of PSS. Vertical air terminal shall be grounded with earth pits. Required civil works for lightning pole erection and grouting including supply of grouting civil materials are in the scope of Contractor. (for 11/11.5kV substation.)	Sets	2	0.00021461204723296
2.09.06	Supply and Erection of 3m long 50mm dia 3.6 mm thick medium class GI funnel type earth electrode with filling of bentonite earthing powder as per standard, four side brick work chamber with cement plastering, white washing and removable type RCC/ cast iron cover plate. Scope includes supply of required bentonite earthing powder, cement, brick, sand, RCC/cast iron cover plate. Minimum 02 earth pits per LDB. Earthing shall be carried out by using 50x6 and 25x3 mm earth flats (Supply and erection rates of earth flats is provided separately.)	Nos.	20	0.00214612047232964
2.09.07	Supply and erection of 600mm Ladder type tray along with all accessories	Meters	60	0.00128767228339778
PACKAGE-B				
BILL OF QUANTITIES FOR OPERATION AND MAINTENANCE PACKAGE-B				
2.10	Operation and running maintenance including attending breakdown jobs for the entire Construction Power Network and Area lighting covered in this contract (Erected and Commissioned under this sub-contract). There should be adequate amount of Electricians and helpers available at site round the clock for this Package along with a Site In charge during day shifts. The maintenance contract period will start after energizing of 04 Nos. of 11kV/433V Package substations and Main 11/11.5kV substation. The scope also includes O&M of High Masts, BHEL Offices, BHEL Stores, BHEL yard, etc.	Months	44	0.23401293797422300

Instructions to the bidders

1. Bidders shall quote Total Lump-sum Price for the entire scope of work (PKG-A & PKG-B) in Rupees in VOL II PRICE BID at BHEL E-procurement Portal. Any other entry elsewhere in the offer of the bidder shall be treated as Null and Void. The total value including value of St No. A shall be automatically calculated on E-portal
2. This Quoted Lump-sum Price shall be distributed based on the BHEL fixed percentage weightages w.r.t the total Total Lump-sum Price quoted by the bidder for the subject tender.
3. BHEL has pre-fixed the Weightage/Factor as detailed above in this chapter for deriving the Unit Rates. By multiplying BHEL pre-fixed the Weightages / Factor and the total prices derived in sl no. 2 above; unit rate of individual items shall be derived. Unit Rate/Item Rate thus arrived shall be rounded off to two decimal places.
4. Based on the quantities of individual item and the item rates arrived in Sl No 3 above, the total amount for individual items shall be derived. Total amount thus derived shall be rounded off to zero decimal places.
5. Grand Total amount for the work shall be derived by BHEL by summing up respective total amounts.
6. Bidders to note that this is an item rate contract. Payment shall be made for the actual quantities of work executed at the unit rate arrived at as per Sl No.3 above.
7. For the convenience of bidders, BHEL has issued an excel sheet with all the requisite formulae as described above. *However the referred excel sheet shall not form part of contract document. Further, this sheet should not be uploaded at the e-Portal.*